



# Spill Response Tools and Equipment

LCDR Tim Callister

United States Coast Guard

Thirteenth District, Chief of Environmental Response

# PPE



- Suits
- Gloves
- Boots
- Eye Protection
- Hardhat
- Hearing Protection
- PFDs





# Spill Response Equipment

Boom, Sorbents, Pumps,  
Skimmers, and Recovery

# Oil Containment Boom

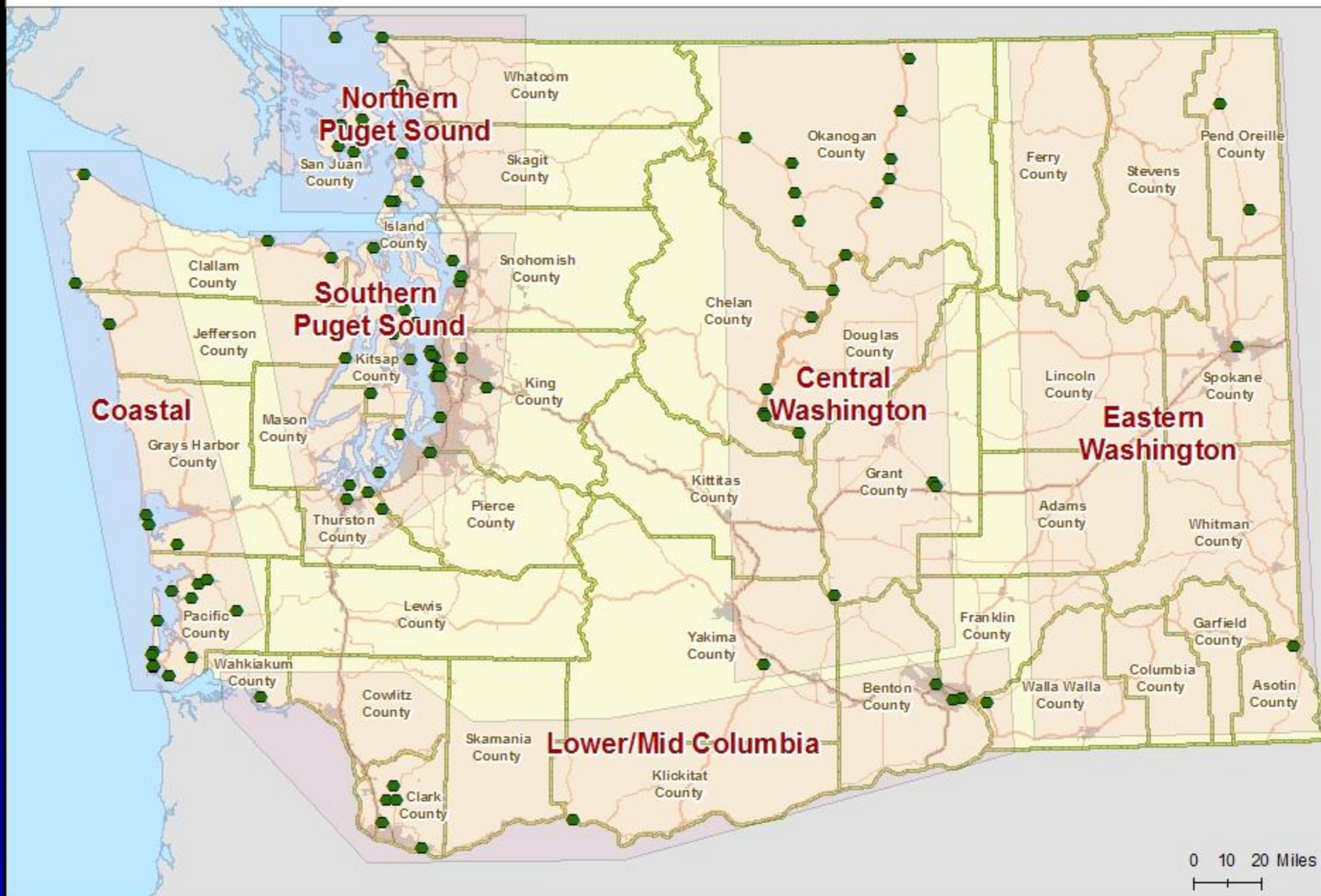
- Three purposes
  - Collection
  - Diversion
  - Exclusion
- Oil boom typed vary in sizes, shape, design, and intended use
- Dept. of Ecology Spill Equipment Caches
  - 99 Trailers strategically placed around WA



# Spill Response Equipment Cache Locations

## Legend

- Equipment Locations
- Regions




# Boom Types

- Internal Foam Flotation Boom
  - “Contactor’s Boom” – comes in all sizes, standard is 18” overall
- Self inflating Boom
  - Has one-way air intake and collapsible chambers
- Pressure Inflated Boom
  - Need leaf blower, compressor or pump to fill air chambers
- Permanent Type Boom
  - Usually black belting with individually attached external floats

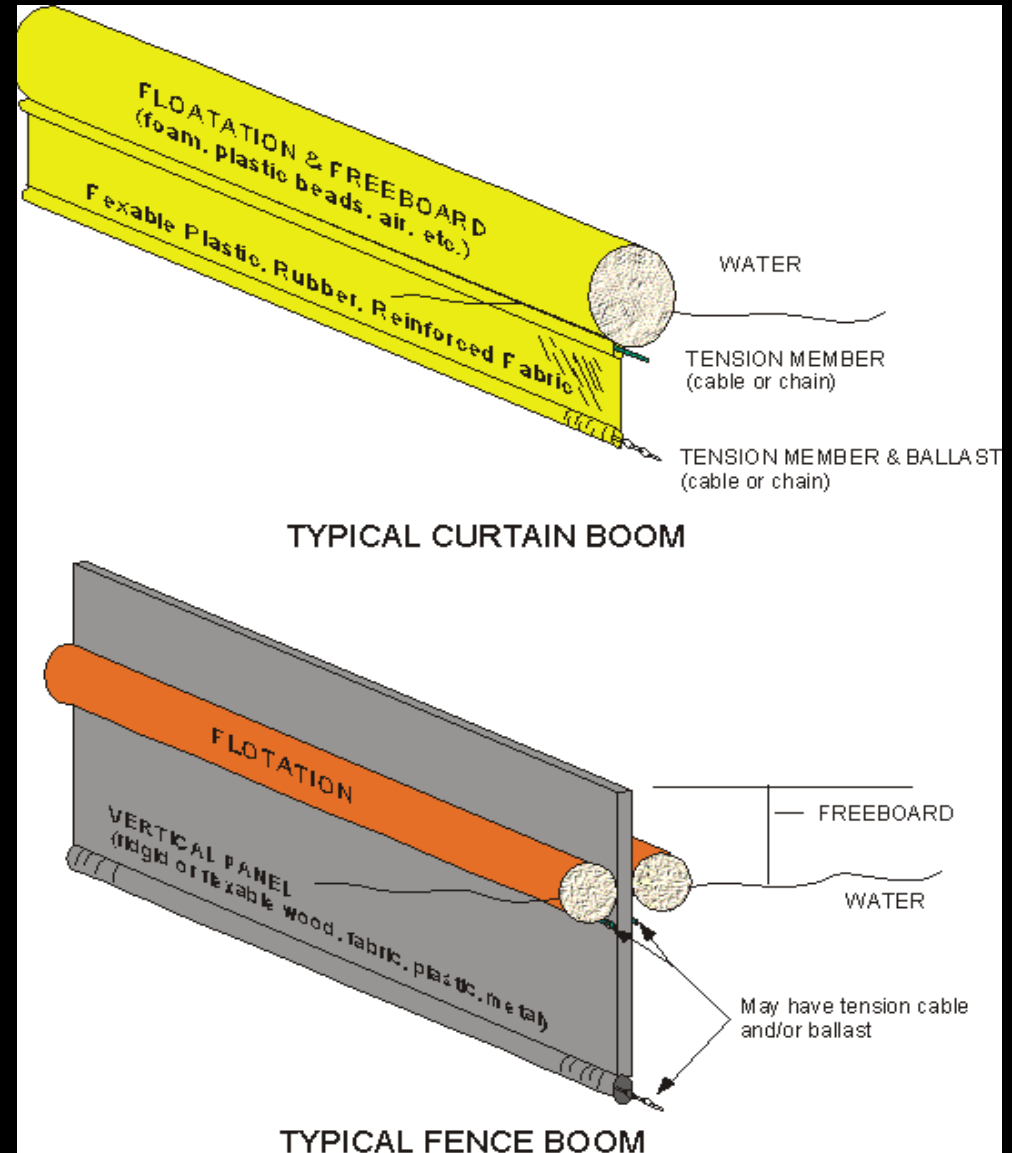


# Containment Boom Topics

- Design/Construction/Accessories
  - Boom Failure
  - Boom Anchoring/Mooring
  - Boom Techniques/Strategies
  - Boom Launching/Recovery
  - Boom Cleaning/Decon
- 

# Boom Design/Construction

- Flotation
- Freeboard
- Skirt
- Tension Member
- Fabric
- Ballast
- Connector
- Anchor Points





# Boom Accessories

- Anchor Systems
- Tether Systems
- Boom Lights
- Tow Plate
- Towing Bridle
- Boom Kit
- Endplate Adaptors/C-Clamps

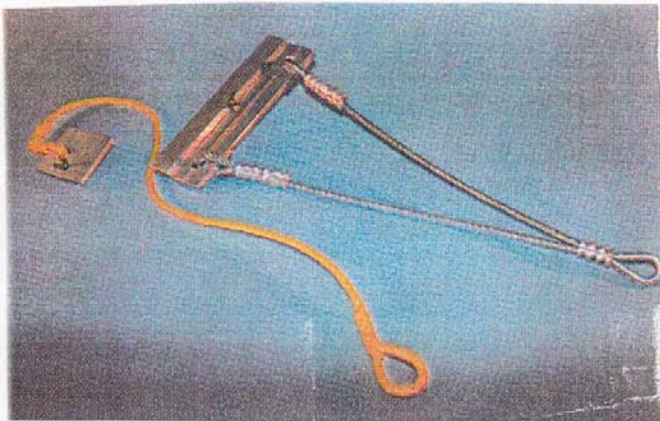


PHOTO #4

BOOM TOW BRIDLE OR MOORING BRIDLE



PHOTO #5

BOOM ANCHORING POSTS

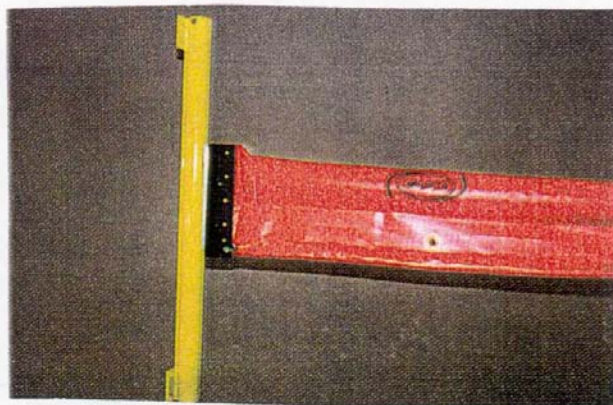


PHOTO #6

BOOM SLIDE CONNECTOR FOR TIDAL ADJUSTMENT

# Boom Attachment





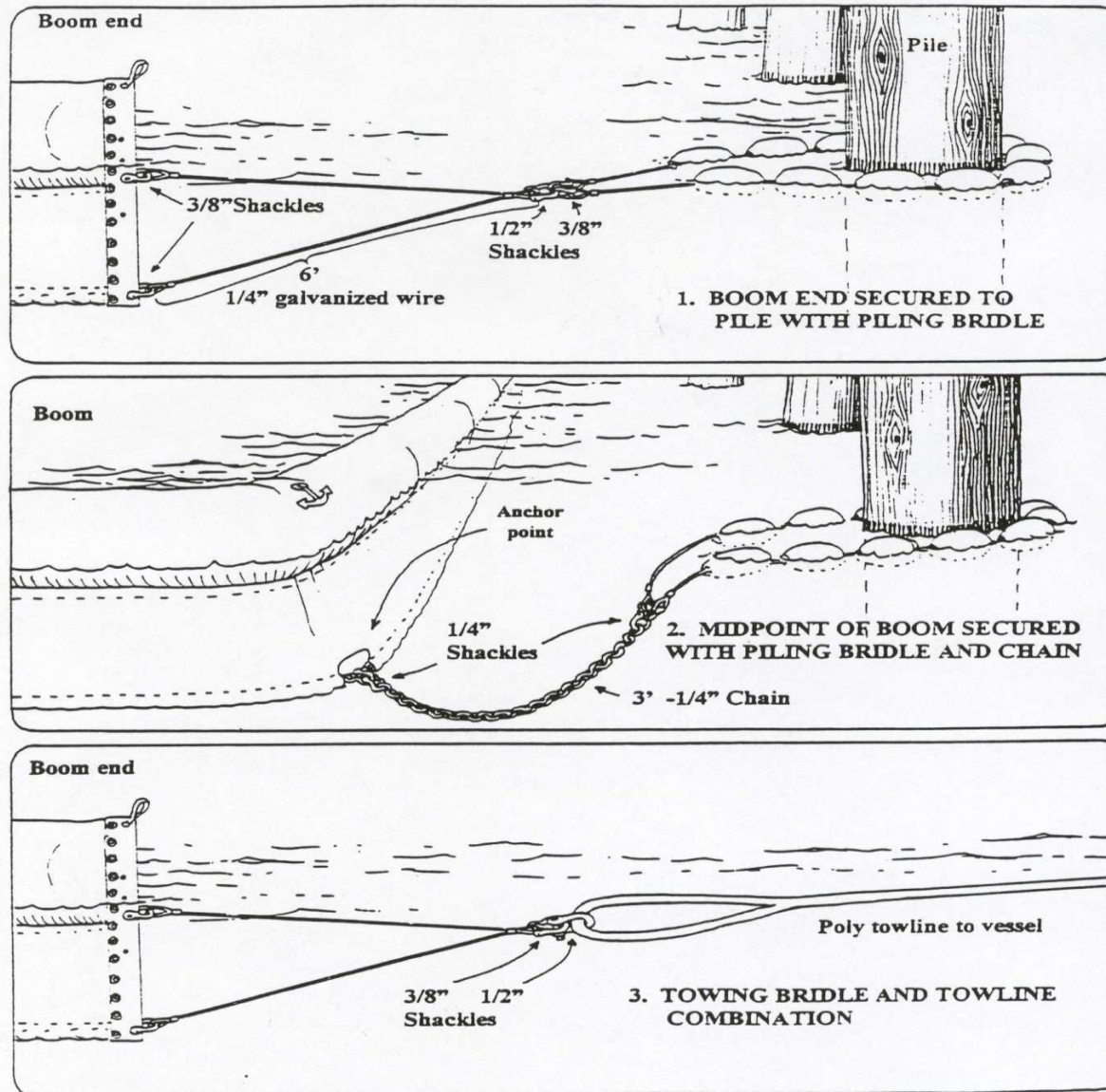
# Mooring Boom to Shore

- Can be complicated with wind, currents and tides
- Find a good anchor point shoreside; concrete blocks, truck, tree stump, DC-10, what ever you can find
- Make sure the boom is above high tide line and no gaps exist
- Make sure to pick the anchor location with personnel safety in mind
- What is purpose of anchoring location: collection site, diversion site exclusion site



Figure #4

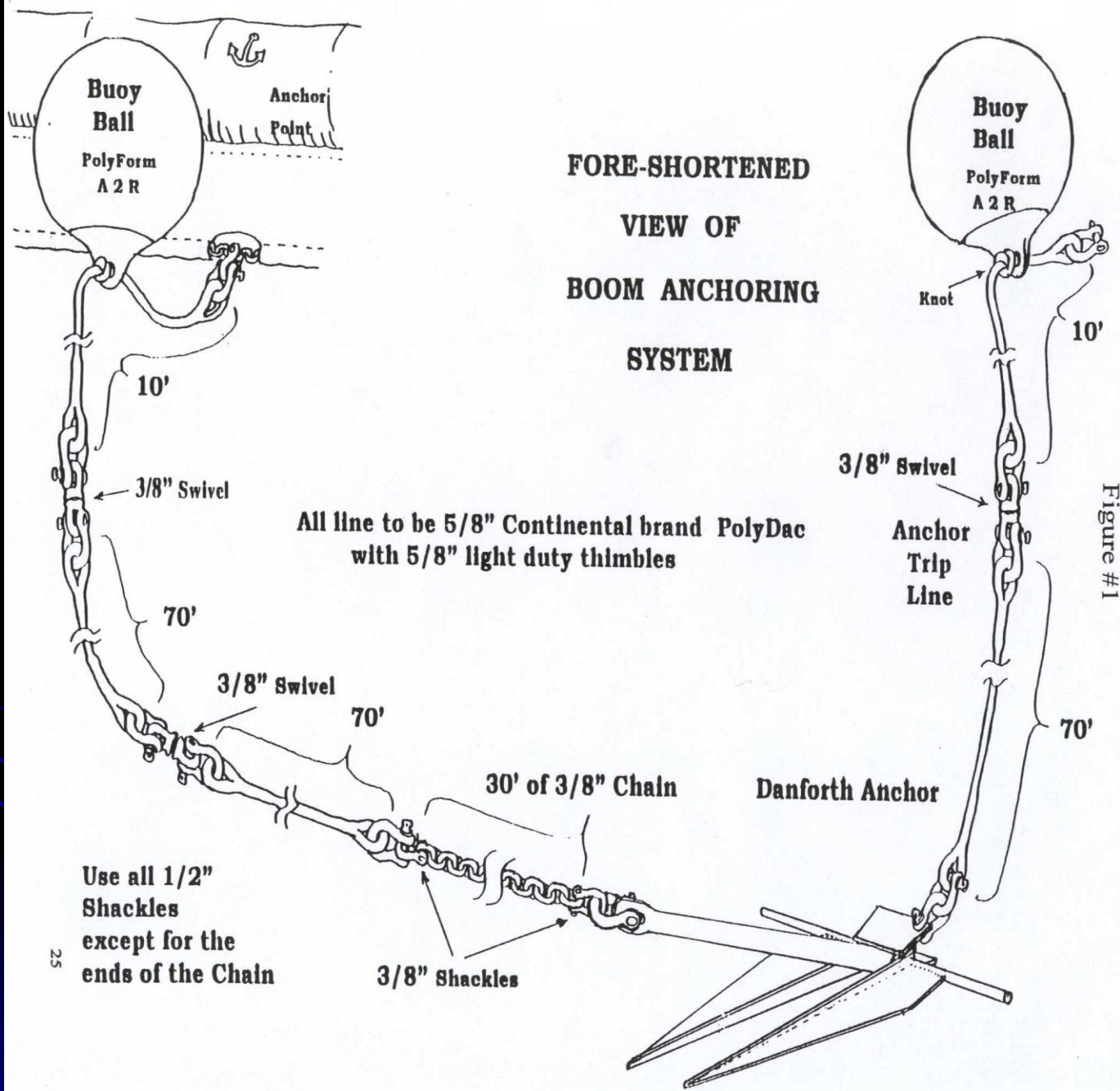
USE of PILING BRIDLES and TOWING BRIDLES





# Anchoring Boom in Water

- Make sure the anchor weight is adequate for operation
- Make sure you have the proper amount of anchor rope
- Attach recovery buoy line to boom at the anchor point
- Slowly begin backing away
- Attach a sacrificial line to the base of the Danforth anchor and to the boat
- Make sure marker buoy and line are free to drop into the water
- Cut or release the sacrificial line so that the anchor drops into position
- You may need to do this multiple times to set the anchor



# Recovery of Anchors

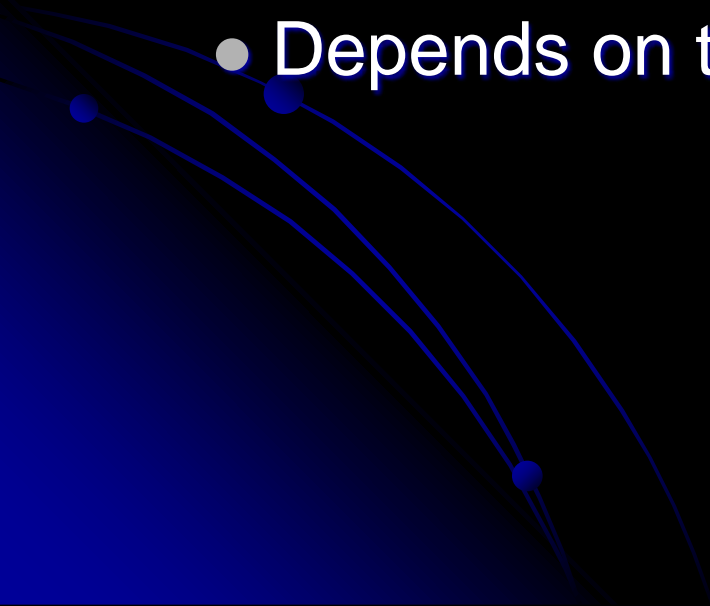
- Flying the Anchor: position the vessel over the anchor site and take a strain on the rope (coil all of the access rope in the bottom of the vessel). Cleat off the rope and head towards shallow water. A Danforth anchor will surface because of its flukes. Once in shallow water, slow down and retrieve the access rope. You will only have to pill up a short amount of rope, chain and anchor.
- Running the Rope: use a mooring line on your vessel and run it under the rope (as it is still attached to the boom). Cleat off the biter end of the mooring line, and head in the direction of the anchor. The buoyancy of the vessel will cause the anchor to release and will pull all the way up to the surface. Be extremely careful so as to not damage the boom fabric or anchor point



# Boom Techniques/Strategies

- The purpose of deploying boom is to contain the spill, divert or collect the oil for recovery, or exclude the oil from sensitive locations
- Take into account the anchoring possibilities, water depth, currents, tidal effects, and weather conditions when you decide to deploy containment boom

# Containment Booming

- Containment boom is used for the initial response to surround of control the oil within the boomed area
  - It is also sometimes deployed around vessels during fuel transfer operations
    - Depends on the facility transferring the fuel.
- 



## LARGE BOOM LOADED WITH DEBRIS



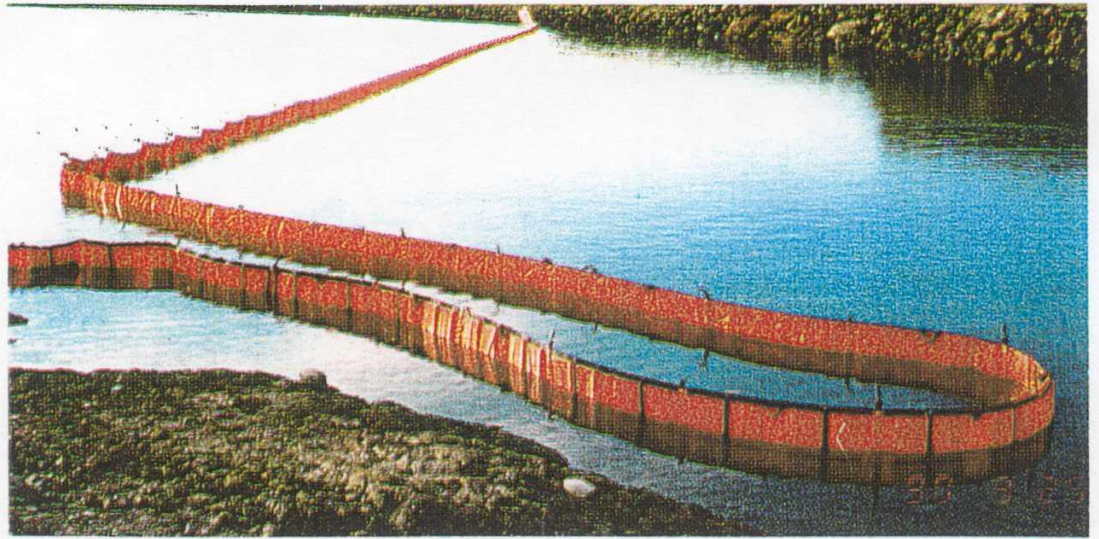
A better angle would reduce load stress



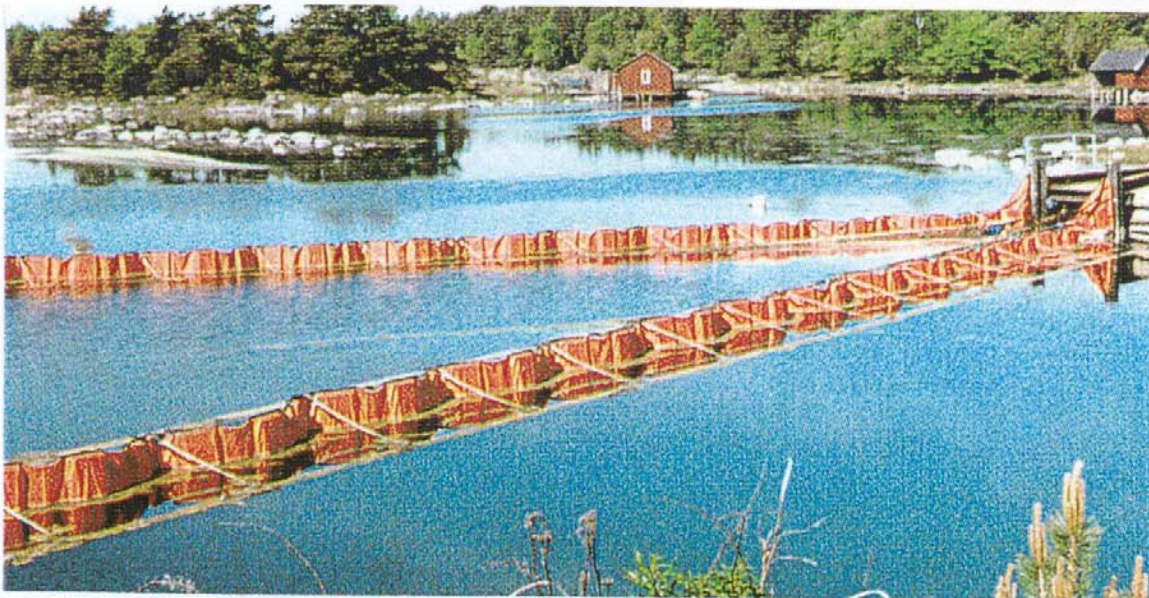
FENCE BOOM IN PLACE WHERE THERE IS CONSIDERABLE DEBRIS

Better angle would help





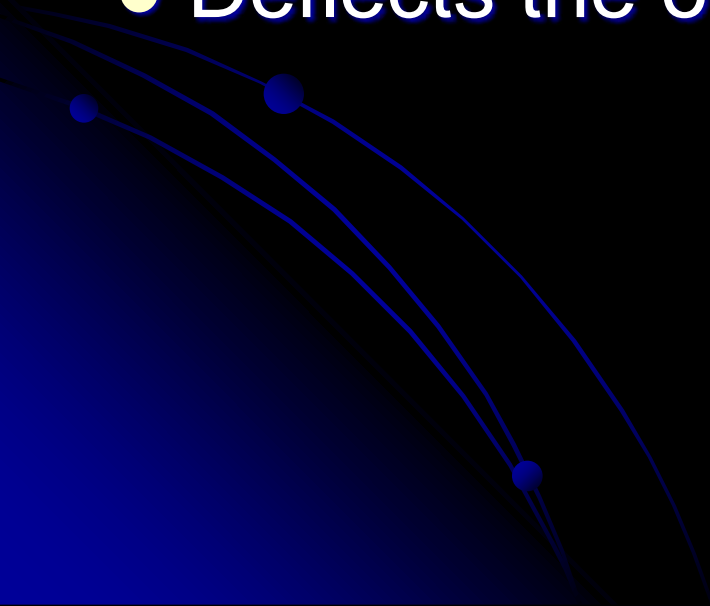
BOOM DEPLOYED USING A COLLECTION POCKET



BOOM DEPLOYED FOR COLLECTION  
Nice straight angle and no sag or belly in boom

# Exclusion Booming

- Used to protect and exclude oil from reaching or entering a protected area
  - GRP mainly use exclusion booming for natural resource protection
- Deflects the oil away from the boom











EXCLUSION BOOMED AREA



EXCLUSION BOOMING OF DOCK  
\*note large amount of anchors required

# Diversion Booming

- Used to divert oil away from a sensitive area or to a collection area
- It can be useful to place several small diversion boom segments overlapping each other to move oil to a collection point; usually used in strong currents
- Deflectors can reduce the number of boom segments needed in fast water

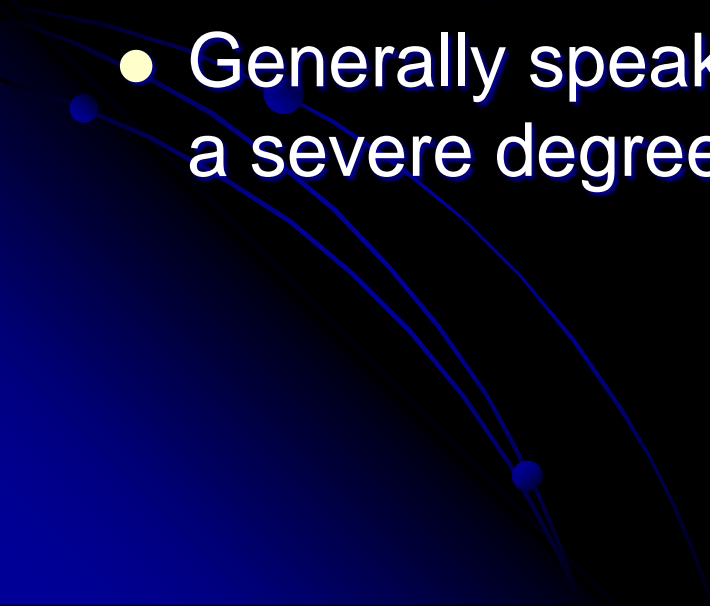
# Deflector

- Far less manpower requirements.
- Effective method of booming in fast water (beyond previous limits).
- Free of ropes means the system will remain effective in the presence of floating debris such as ice or logs.





# Diversion Boom Angles

- Depending on the current, the angle at which boom needs to be placed will vary
  - If boom is not positioned at the correct angle, oil will entrain
  - Generally speaking, oil will entrain at one knot
  - Generally speaking, boom needs to be angled at a severe degree ( $15^{\circ}$ )
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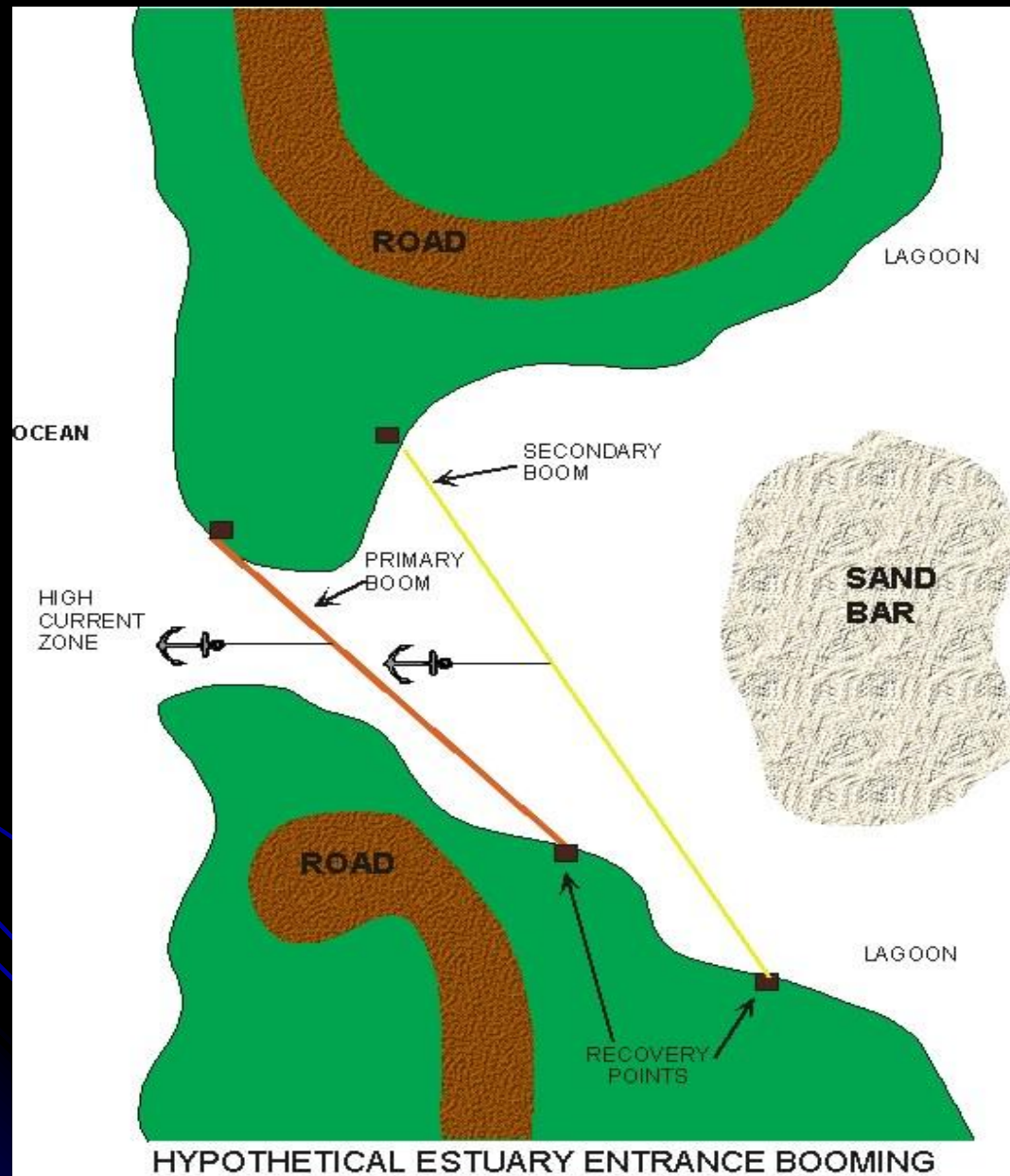
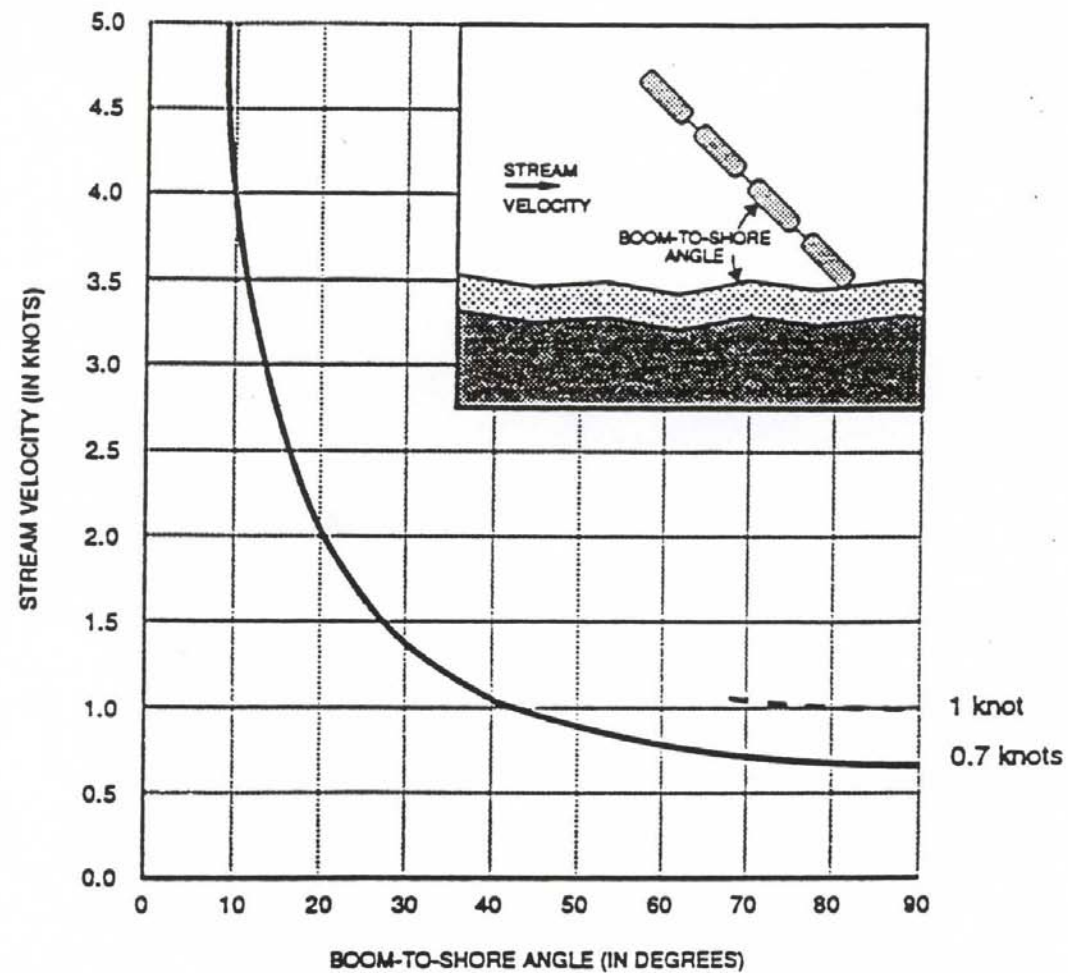


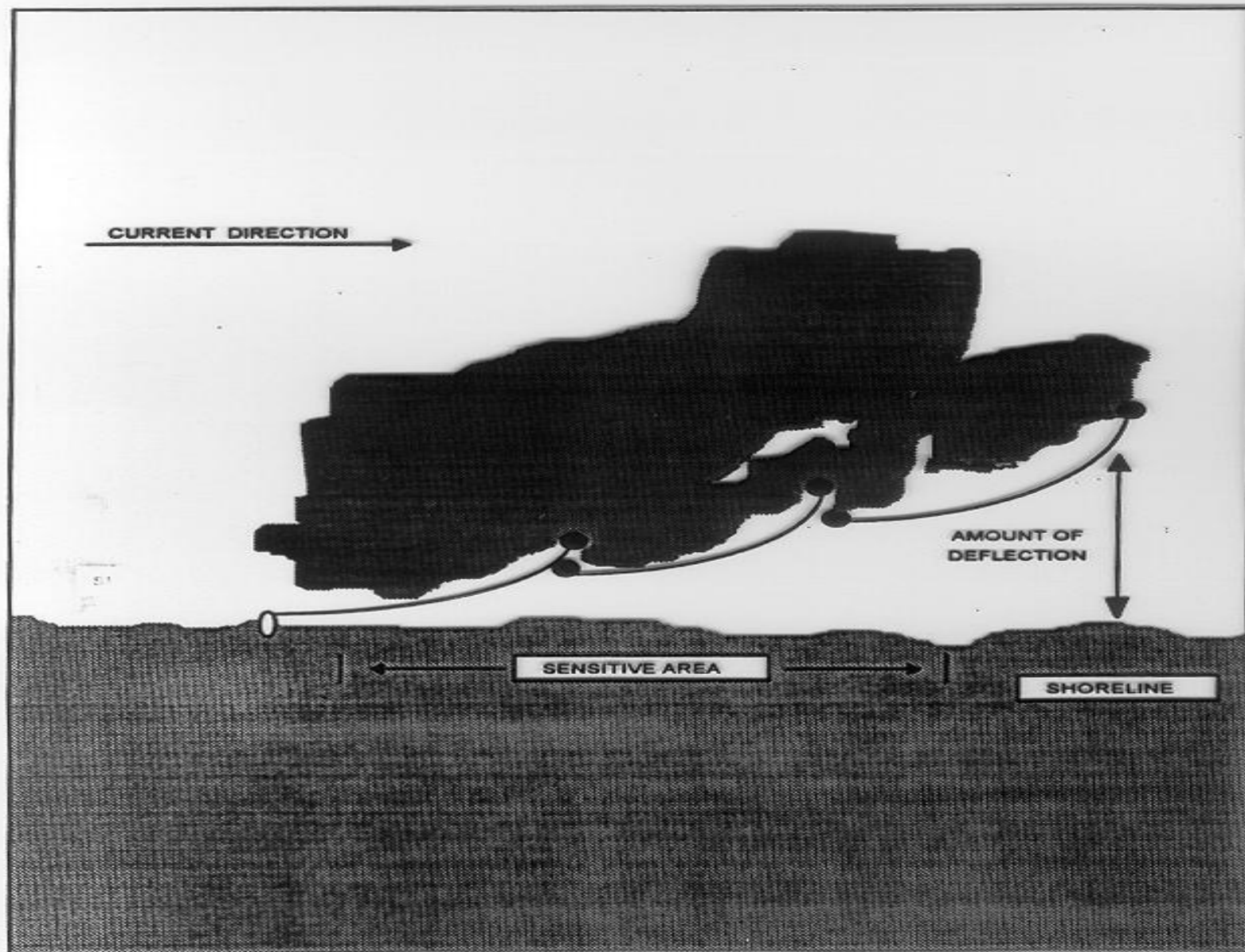
Figure #5



Boom Angles for Equivalent Velocities



## CASCADING DIVERSION BOOMS













# J-Boom Configuration

- Two vessels tow the same piece of boom into the oil
- The boom can then be connected together to encircle the oil, or it can be towed to another recovery location
- It is very difficult to do; the boom cannot be towed upriver, or over 1 knot because the oil will entrain



# Enhanced Recovery Booming

- Used to collect oil on the open water
- The booms are towed by vessels attached to an oil recovery vessel
- This allows for a broader sweep width, which increases the amount of oil encountered
- The oil then is diverted into the skimming unit on the oil recovery vessel



# Boom Launching

- Pick a deployment location that allows the boom free access to the water; limit chafing and rubbing
- Attach a tow line to the tow plate
- Use the vessel power to pull the boom into the water
- Deployment crews need to be extremely careful to not get caught in the bite
- Make sure there are no twists in the boom

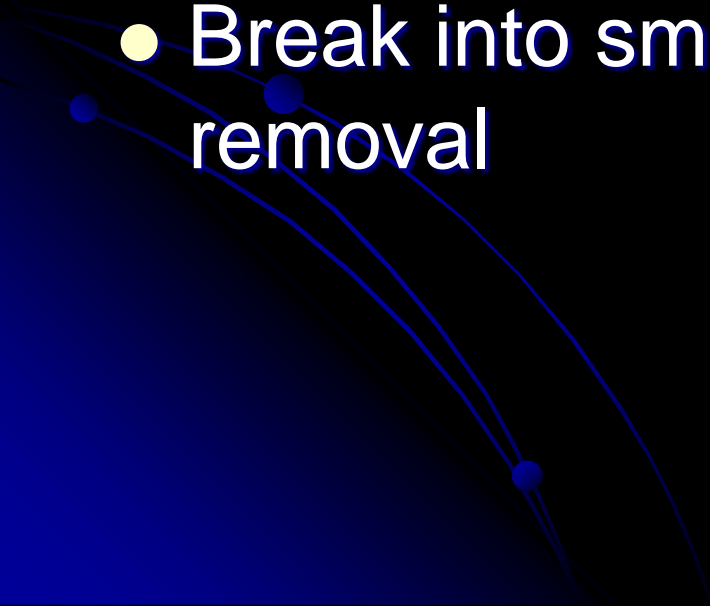
DON'T



DO



# Boom Recovery

- Find a spot which limits rubbing and chafing
  - Usually manual labor is the best option
  - Make sure to flake boom correctly
  - Break into smaller sections to ease removal
- 

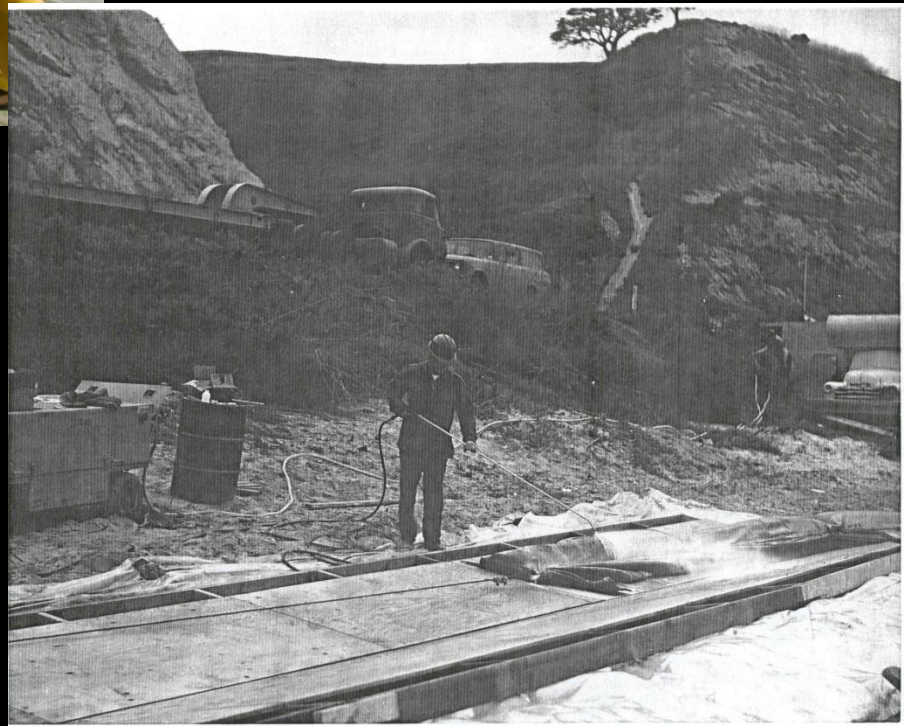
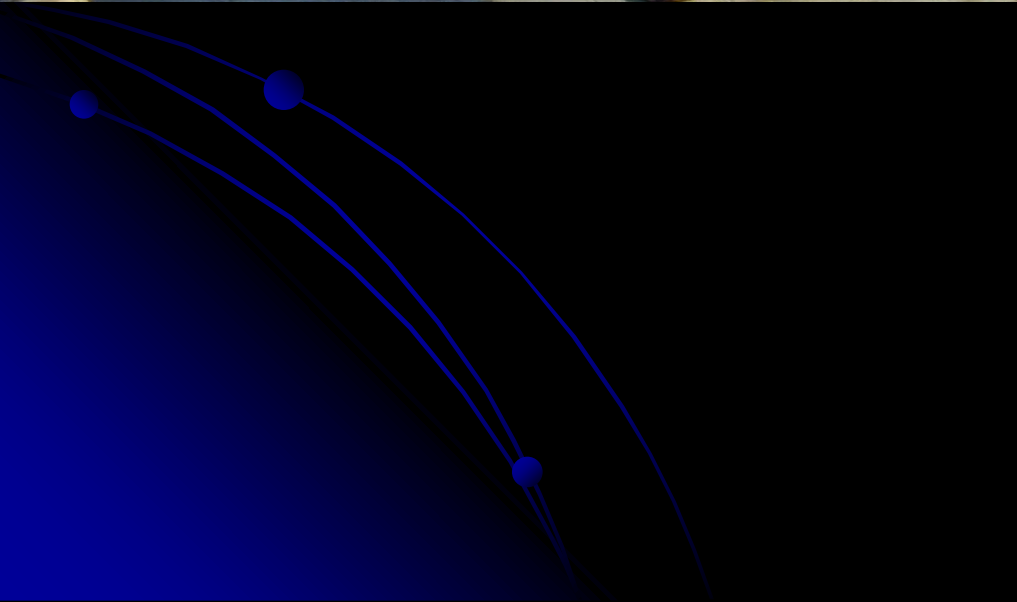
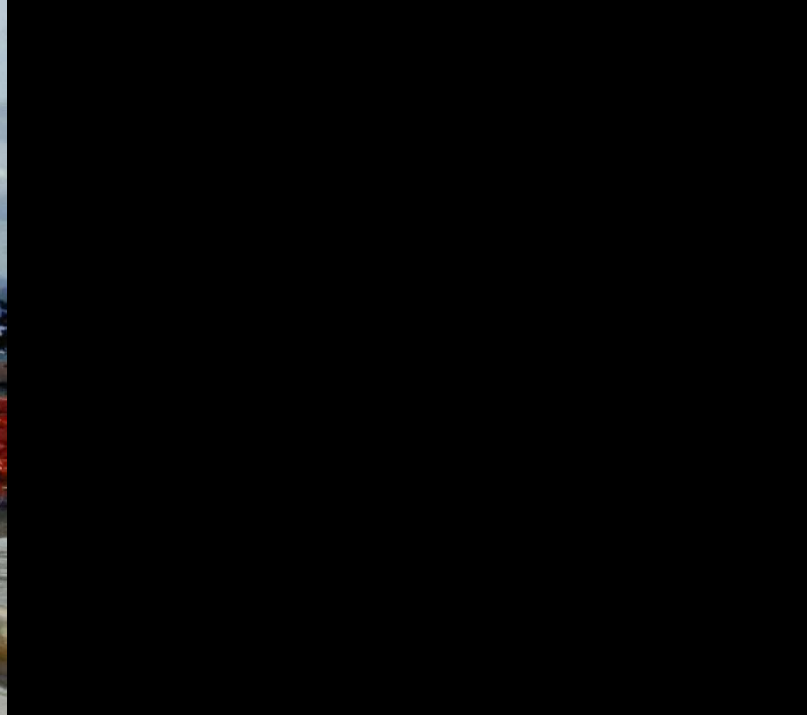


# Boom cleaning

- Select a site that is flat, free of rocks and sharp objects
- Make sure there is a slight berm so oily water is contained and can be collected
- Install a liner under the decon operations
- Hand wipe the gross contamination
- Scrub boom with detergent or degreaser
- High pressure, hot water works best for flushing the boom; be careful not to ruin boom fabric with prolonged cleaning
- Inspect boom for any necessary repairs
- Let boom dry before repacking







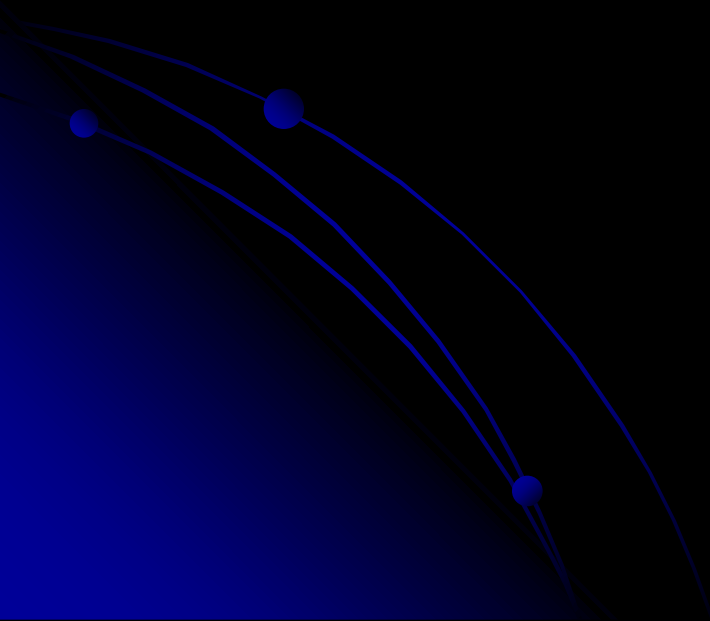


# Boom Problems



# Boom Failure

- Boom Failure is caused by the forces that act upon the boom; typically the three forces are waves, wind, and current.
- Drainage
- Entrainment
- Boom Submergence
- Splash Over
- Boom Planing
- End Connector Failure
- Ballast Chain/Tension Failure
- Boom Fabric/Twist
- UV Failure



# Drainage/Entrainment

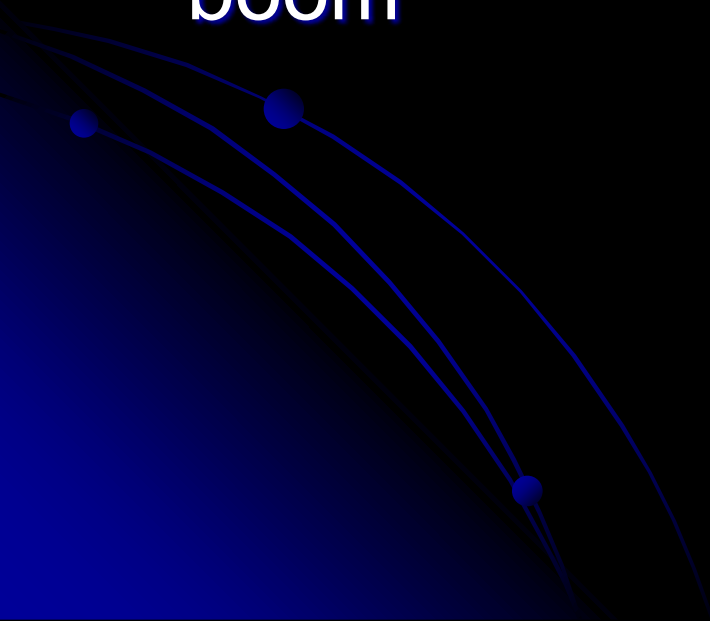
- Drainage; oil builds up to a depth in front of the boom skirt so that oil breaks off and flows under the boom
- Entrainment; oil becomes trapped in the water flowing under the boom then resurfaces downstream



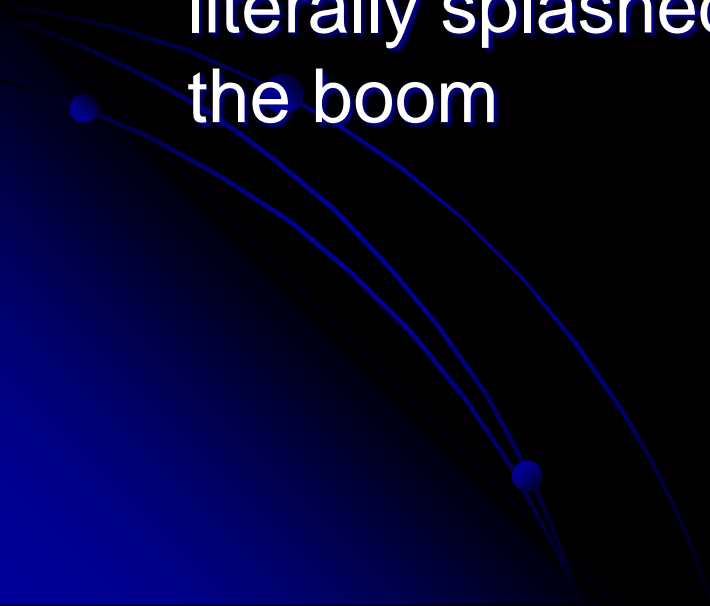


# Boom Submergence

- Boom submergence is directly related to current velocity; usually caused by improper deployment when high perpendicular water forces act upon the boom



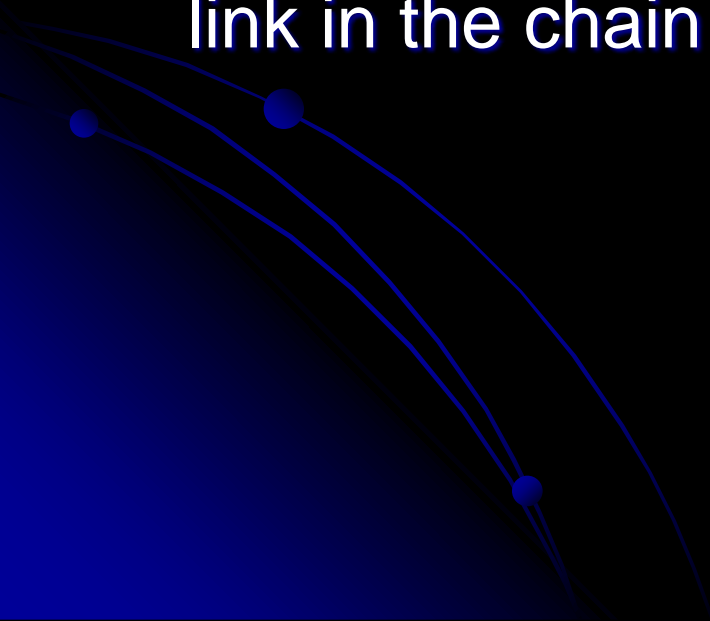
# Splash Over/Planing

- Splash Over; boom failure occurs due to high winds that create choppy sea conditions; oil is literally splashed over the boom
  - Planing; boom failure occurs when boom is deployed in a high current and/or wind conditions; boom skirt is pushed up and does not hang down properly to contain oil
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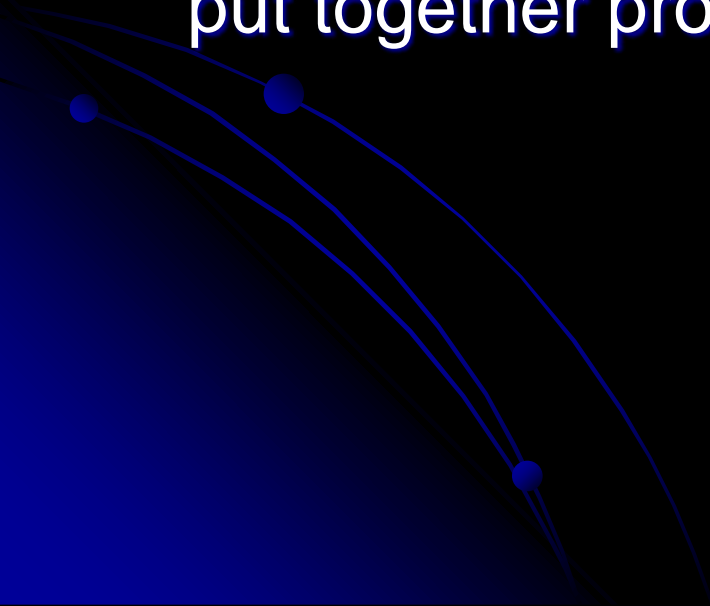


# Ballast Chain/Tension Failure

- Ballast Chain; occurs when the boom is under high wind or current stress; the chain separates at a link in the chain
- Tension; the top tension member separates and puts undue strain on the other structural components of the boom; occurs under high wind/current

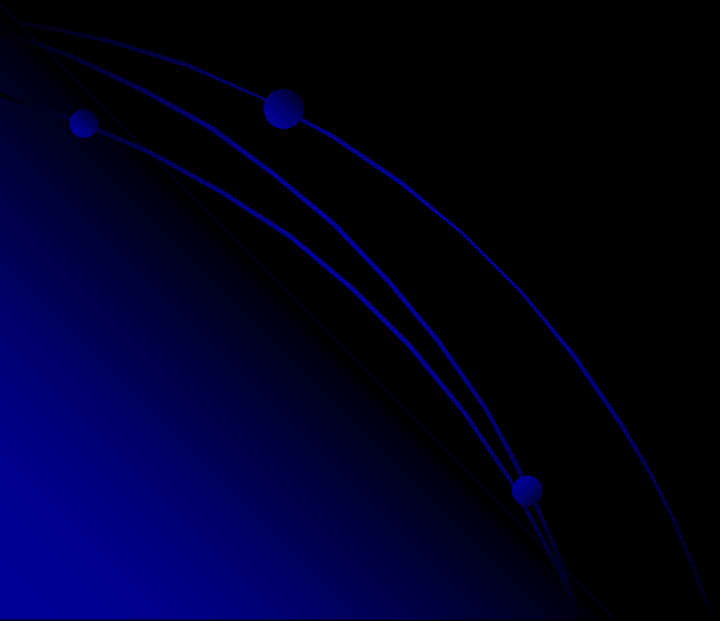


# End connector Failure & Boom Fabric/Twist

- End Connector Failure; the plate undergoes considerable stress and breaks or it was put together properly
  - Boom Fabric/Twist; the fabric itself can rip under stress, and if improperly deployed, a twist can develop which allows oil out of the containment
- 
- A decorative graphic in the bottom-left corner of the slide. It consists of three curved, parallel lines that sweep upwards and to the right. Each line has a small blue dot placed on it. The lines and dots are a light blue color, contrasting with the dark blue background.

# Bolts/Pins/Shackles

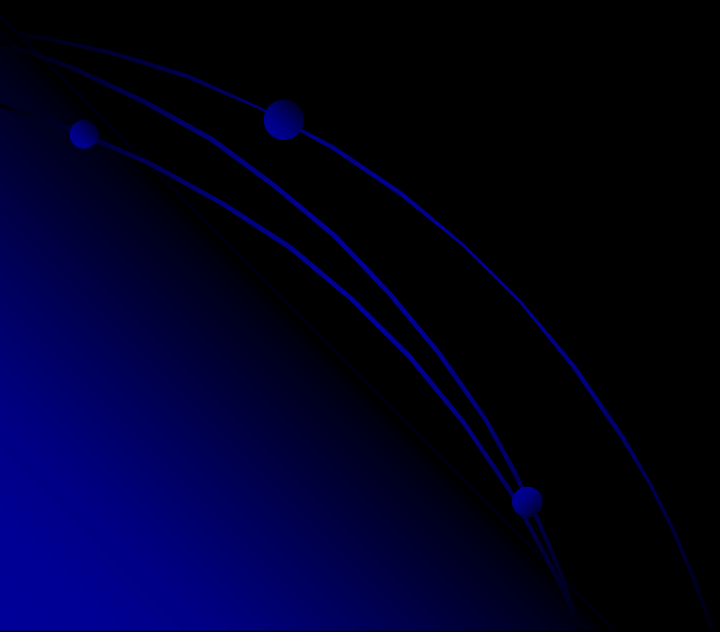
- Usually occurs from human error
- If these items are not tightened, the boom can come apart at the endplate connection of two sections of boom





# UV Failure

- The boom fabric can become extremely brittle if left uncovered in the direct sunlight
- The fabric then rips, which allows oil into the flotation member and chamber



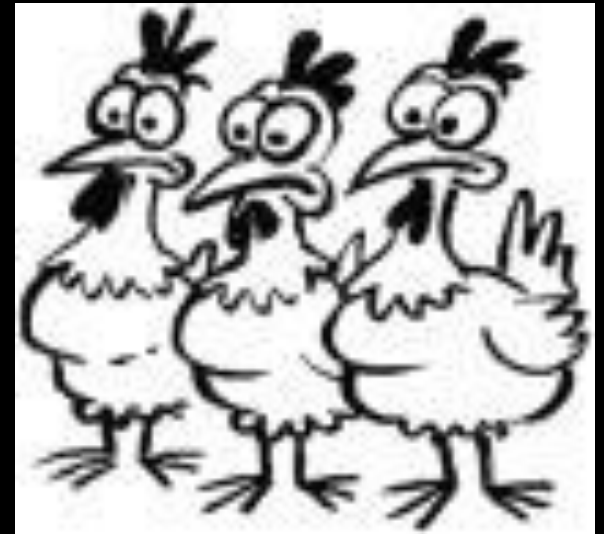
# On Water Recovery



Sorbents  
Pumps  
Skimming Systems  
Outside Skimming Resources  
(Open Water)

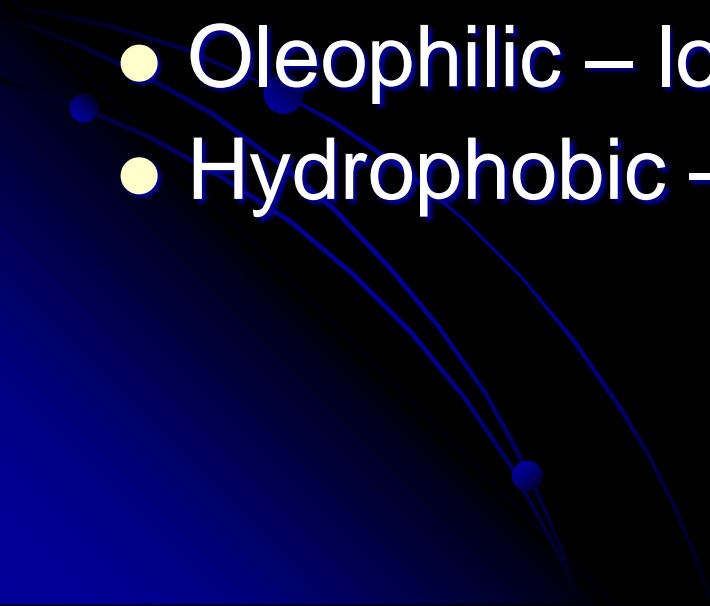
# Sorbent Types

- Sorbents are materials that soak up liquids
- They can be made to specifically pick up oil or chemicals or both
- Sorbent materials may be organic, inorganic, or synthetic





# Sorbent Definitions

- Adsorption – the gathering of substances over the surface of the adsorption material
  - Absorption – the incorporation of a substance throughout the body of the absorbing material
  - Oleophilic – loves oil
  - Hydrophobic – Hates water
- 

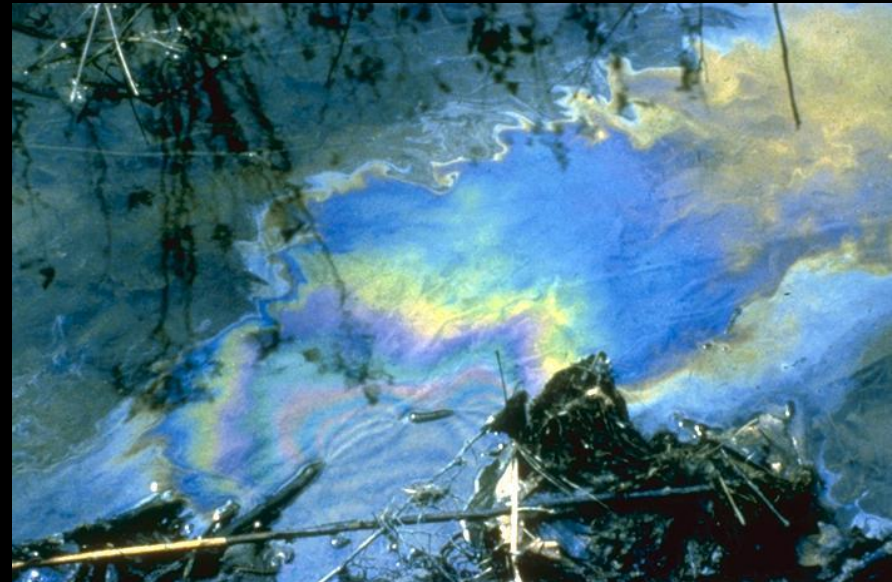
# Sorbent Pads



- Usually 18" x 18"
- 100-200 pads/bale
- Used under pumps, valves
- Used on flat surfaces
  - Parking lots, on-water

# Sorbent Sweep

- A continuous roll of sorbent material with a  $\frac{1}{4}$  poly line as a tension member
- Advantages
  - Relatively cheap
  - Works well on all oil
- Disadvantages
  - Has no draft





# Sorbent Boom



- Strands of loose particulate of sorbent material encased in a netted fiber
- Advantages
  - Can absorb a significant amount of light fuel oils
  - When used in front of containment boom, it can reduce boom cleaning costs
- Disadvantages
  - Can tear/rip and cause difficulty in recovery
  - Does not work well with viscous products
  - Expensive; Heavy when contaminated

# Pom-poms/Snares

- Strands of recycled old phone line fiber strung on a rope
- Advantages
  - Extremely effective with viscous oils
- Disadvantages
  - Does not work well on light oils
  - Easily entangles: wildlife, rip rap
  - Can leach if not attended



# Pumping Systems

- Purposes
  - Product collection
  - Dewatering
  - Product transfer
  - Flushing/herding
- It is important to understand each type of pump's capabilities and limitations, so you can choose the best type for your needs



# Trash Pumps



- Advantages

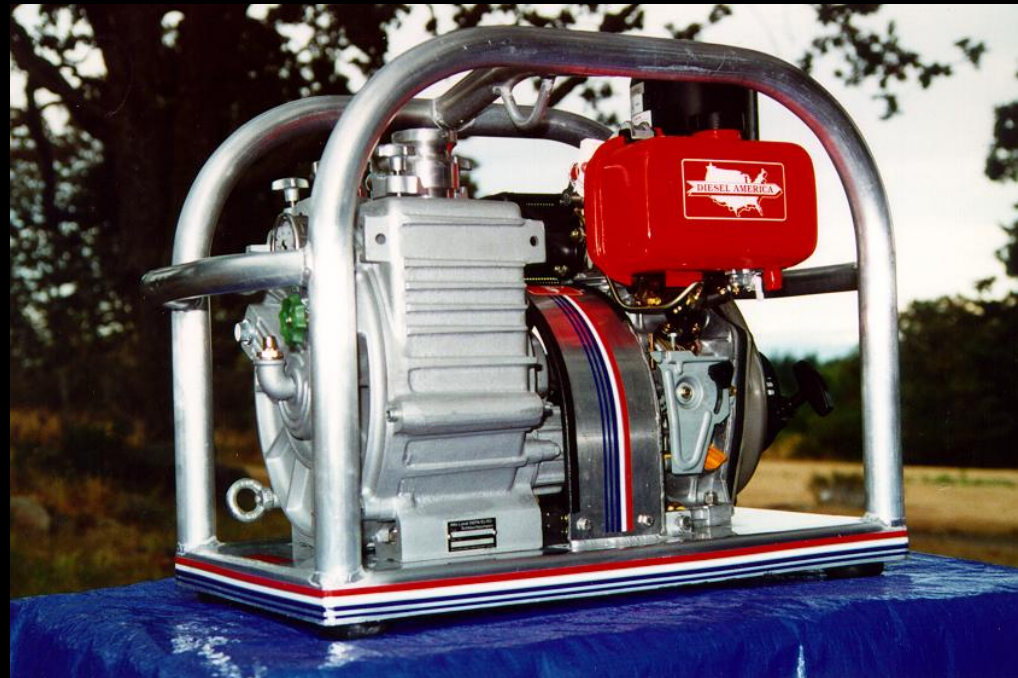
- High volume for dewatering and light fuels
- Inexpensive

- Disadvantages

- Difficult to use on viscous products

# Peristaltic Pumps

- Advantages
  - Great vacuum
  - Great for viscous products
- Disadvantages
  - Expensive
  - Heavy
  - Low flow (100 gpm)



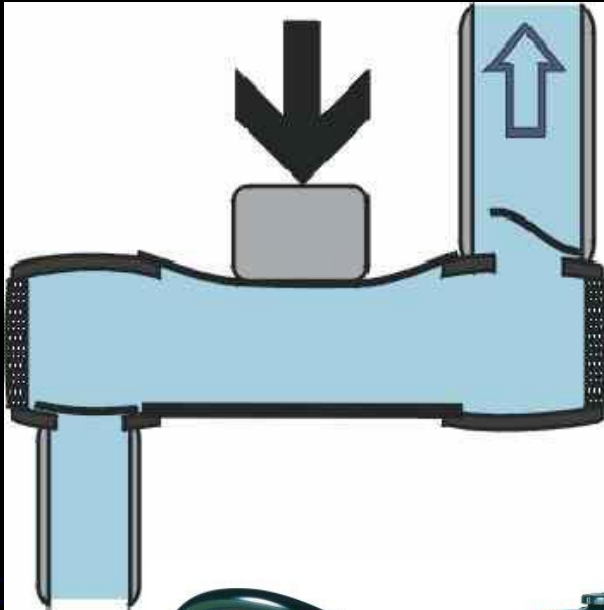
# Submersible Pump

- Advantages
  - Viscous products
  - High flow rate
- Disadvantages
  - Needs hydraulic power pack
  - Usually significant logistical support





# Diaphragm/Air-Driven Pumps



- Advantages
  - Great for stripping
  - Can pump sludges, small rocks, debris
  - Dry prime
- Disadvantages
  - Low flow

# Collection Systems

- Weir Skimmers
- Rope Mop Skimmers
- Drum Skimmers
- Disk Skimmers



# Weir Skimming System

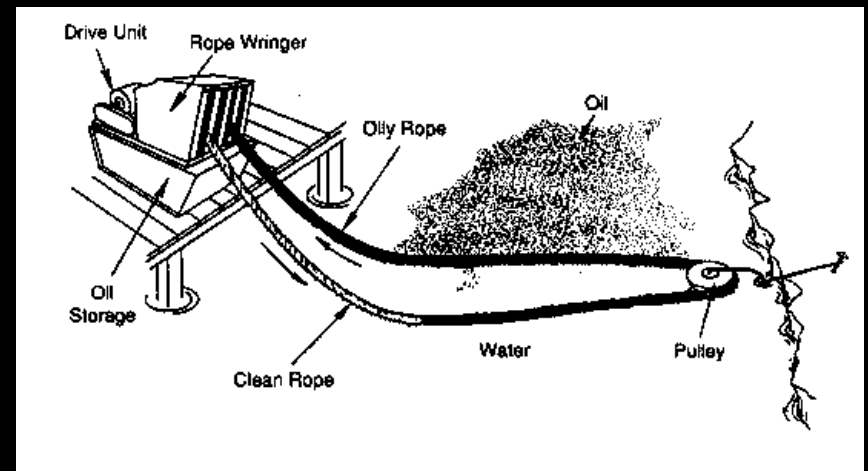
- Oil is separated from water by hinged weir and pumped to storage
- Advantages
  - High volume recovery
  - Few moving parts
  - Operates in shallow water
  - Capable of small debris processing
- Disadvantages
  - Does not perform well in high seas
  - Requires significant depth of surface oil
  - Low recovery efficiency
  - Needs large temporary storage





# Rope Mop Skimming Systems

- Endless loop of oleophilic rope is drawn through the water and into a wringer that squeezes the oil from the rope into a basin
- Advantages
  - High recovery efficiency
  - Portable units operate in shallow water
- Disadvantages
  - Cannot process debris
  - Requires support equipment to deploy and operate



# Drum Skimming Systems

- Oil adheres to oleophilic drum and then scraped from drum into sump
- Advantages
  - High recovery capabilities
  - Excellent recovery in debris
- Disadvantages
  - Need lots of storage to keep up with recovery

# Disc Skimming Systems

- Advantages

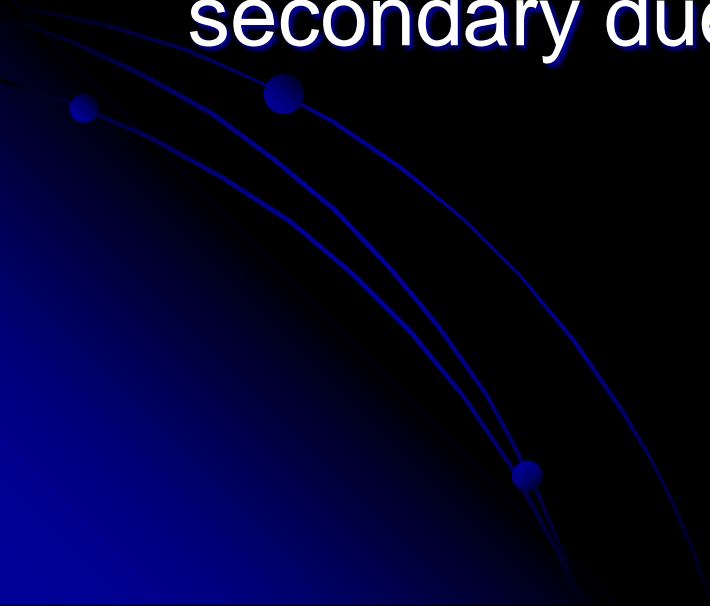
- High recovery efficiency
- Can be operated relatively unattended
- Good for confined locations

- Disadvantages

- Does not perform well in high seas
- Cannot process debris



# Outside Skimming Sources

- Most likely USCG or US Navy dedicated Oil Response Vessels (OSRV) initially
  - Vessel of Opportunity Systems (VOSS)
  - Contractor resources most likely secondary due to mobilization time
- 

# Temporary Liquid Storage

- When recovering products off the water, there are a variety of temporary storage options:
  - Barrel
  - Basin
  - Fast Tank
  - Baker Tank
  - Bladder
  - Vac Truck
- However, be aware that you will have to remove the product from you temporary storage; make it an easy job by planning ahead

# Shoreline Recovery Operations

- Natural Recovery
- Manual Recovery
- Passive
- Active
- Trenching
- Mechanical Recovery
- Flushing
- Vegetation Cutting





# Vegetation Cutting

- Check with someone before you cut!
- Remember, the goal of shoreline recovery operations is to minimize the environmental impact
- Natural Resource Damage Assessment personnel assist in determining whether to cut or not to cut

# Flushing



- Water stream is used to generate current to remobilize floating oil trapped into containment areas; or
- Sheet of water is used to float and transport remobilized oil down a beach to boomed area for recovery
- A need for higher pressure and water temperature when the oil becomes more weathered

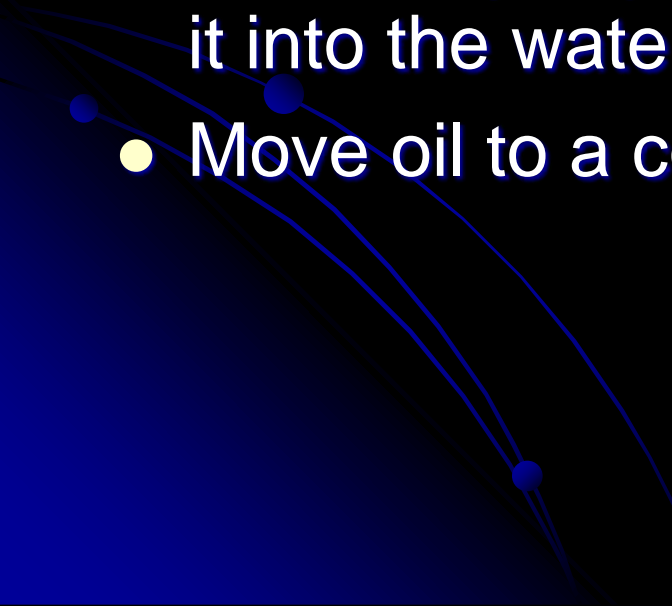


# Deluge

- A waterfall effect on a shoreline using hoses with holes along a side
- Oil caught on beach, rip rap, gravel will be flushed back into the water where it can be captured or collected



# Herding

- Human generated forces to drive/herd oil on water
  - Either done by prop-washing or utilizing portable pumps with a fire nozzle or duckbill attachment
  - Extremely important to move oil rather than drive it into the water column
  - Move oil to a collection point for recovery
- 

# Cold Weather Oil Response

- Different than warm climates due to:
  - Environment, including remoteness, surrounding terrain, and temperature
  - Oil in ice conditions (oil on, in, amongst and under ice)
  - Physical makeup of oil and its behavior in cold temperatures
  - Clean-up techniques in cold weather

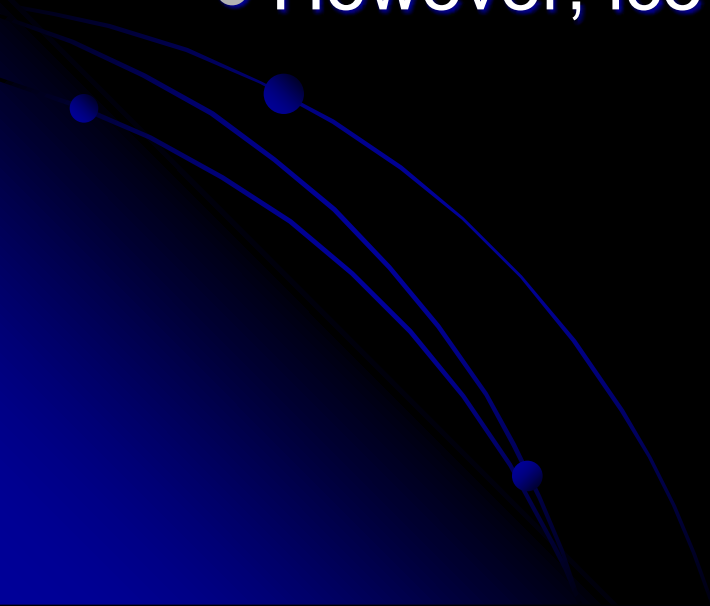
# Cold Weather Influence on Oil

- Increases viscosity
- Air and Water temperatures approaching pour points
- Decreased evaporative loss rates
- Reduced spreading rates and coverage
- Limited spread/transport due to ice/snow
- Entrainment and sinking
- Expansion/contraction due to temperature change

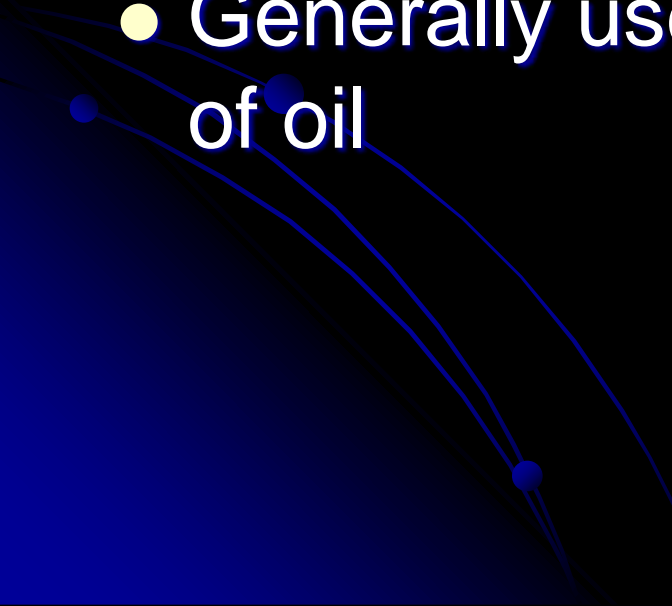


# Containment Issues

- Ice and Boom
  - Ice moved by current can drag anchor systems, roll boom over or destroy boom
  - Need upgraded tension members
  - However, ice can act as containment



# Cold Weather Sorbent Use

- Under severe cold conditions, they may not be as effective as in normal conditions
  - Treat the choice of sorbent as you would for lower viscosity products
  - Generally used for small isolated patches of oil
- 

A scenic view of a lake with mountains in the background, framed by tree silhouettes. The lake is calm, and the mountains are covered in green forest. The sky is clear and blue. The foreground shows a grassy area with a wooden bench and some logs.

# Ditch/Culvert Response

Under-Flow Dam

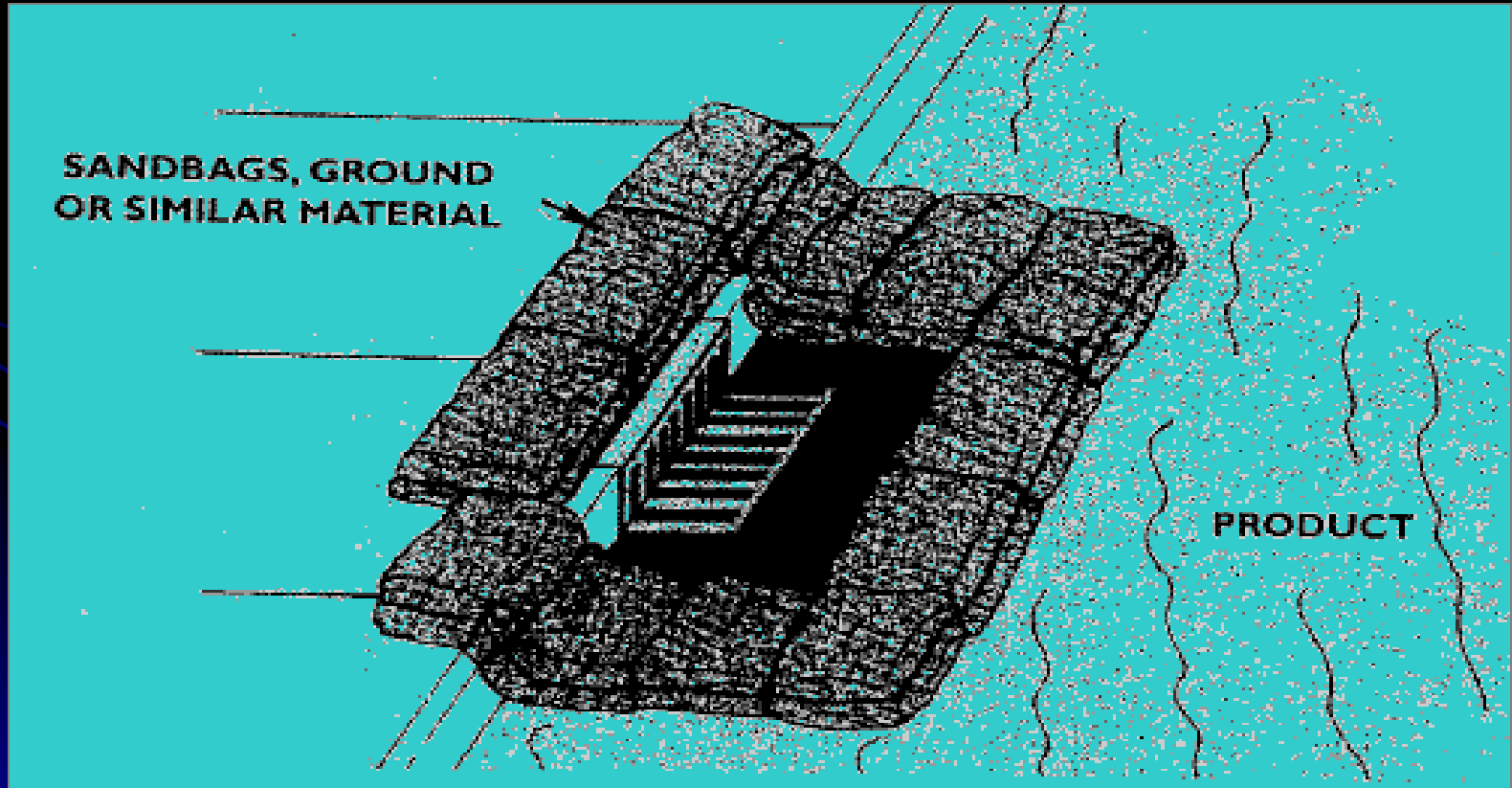
Over-Flow Dam

Over-Flow Dam with Boom Barrier

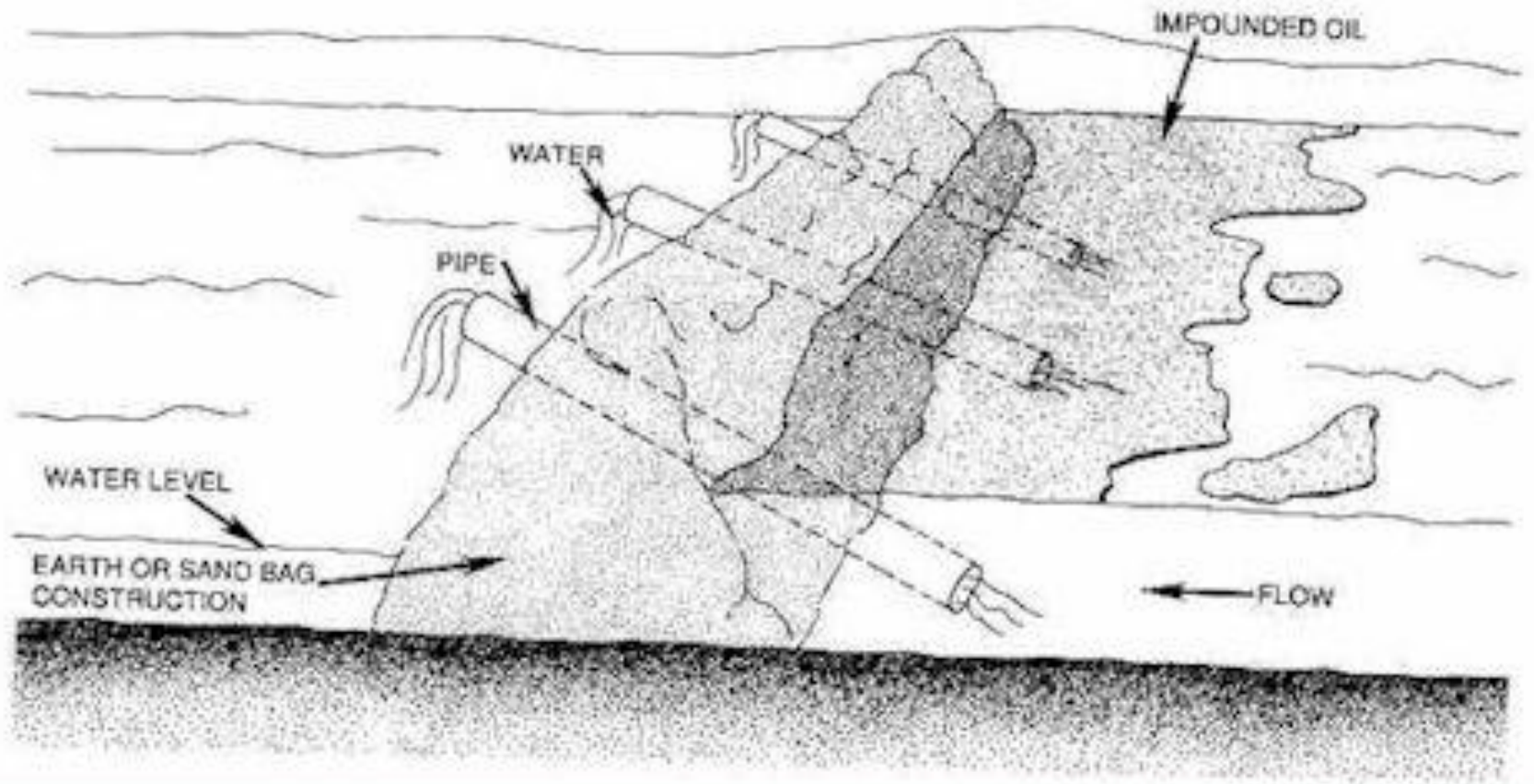


# Culvert/Wastewater Protection

- Use what's available



# Underflow/Siphon Dam



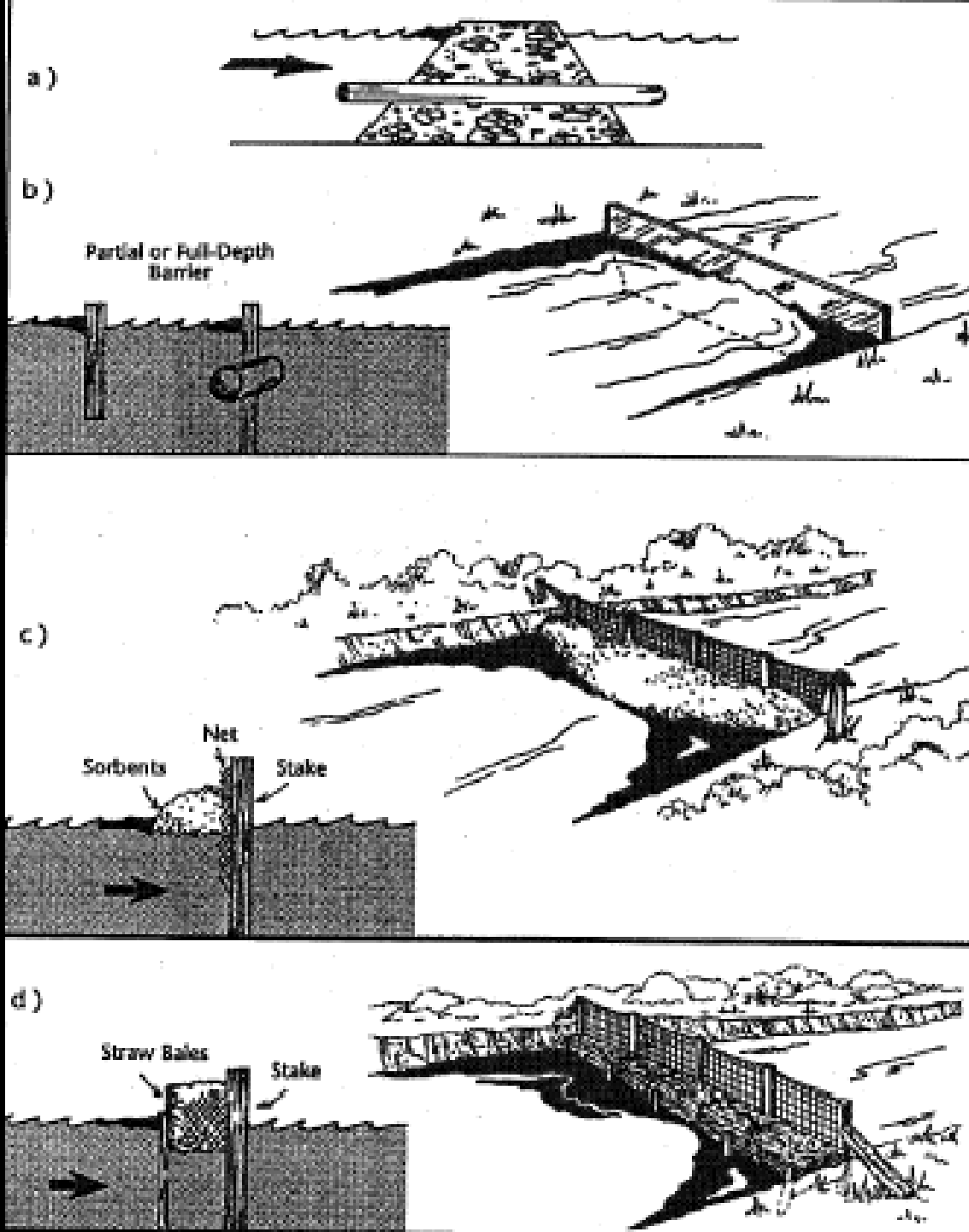
- Siphon Dam

- Weir Dam

- Filter Dam

- Filter Dam with natural sorbent media

Field Guide for the Protection and Cleanup of  
Great Lakes Oiled Shorelines, Owens  
Coastal Consultants





# Underflow Dam at Kamela

- Diesel spill on bank, seeping through soil













# Overflow Dam





# Filter Dam







# Waste Management

Solid Waste  
Liquid Waste  
Decontamination



# Solid Waste Storage/Disposal

- Solid waste is typically in the form of oily sorbents or oiled sediments (sand, gravel, debris, garbage, PPE)
- Oiled solids should be separated into four categories: Oiled sorbents, oiled plastics (PPE/other garbage), oiled sediment, and oiled vegetation
- Non-oiled waste, such as clean PPE and plastics, should not be included with oiled materials. Generally they can be thrown into the regular waste stream

# Solid Waste Storage/Disposal

- Typically oiled sorbents are stored either in heavy mil bags or drums
- Roll off boxes for segregation
- Interim storage site should be a large lay down area with a berm constructed for containment to limit secondary spillage
- Will most likely be burned or land filled
- Do not touch oiled wildlife!

# Decontamination

- The purposes of decon operations is to neutralize or remove potentially harmful contaminants from personnel and equipment
- A secondary effect of decontamination operations is to confine the contaminants within the affected area
- Equipment decon requires many logistical support services (similar to boom cleaning) such as interim storage for oily water that is generated



# Personnel Decon

- When personnel leave the contaminated site, they need to be fully deconned. This involves removal of PPE through a series of stations
- For standard oil spill response. The level of PPE is either Level D or a Modified Level C (no respirator)
- Decontamination Site
  - Adjacent to contaminated site
  - Flat open area
  - Near water supply, medical service

# Decon Procedure

- Tool Drop
- Gross decon
  - Scrub boots, suit, gloves; or
  - Outer PPE removed and discarded
- Inner garment removal
  - Glove liners, etc.
- Field wash
  - Hands and face
- Medical monitoring (if needed)

# Questions?





# VESSELS OF OPPORTUNITY

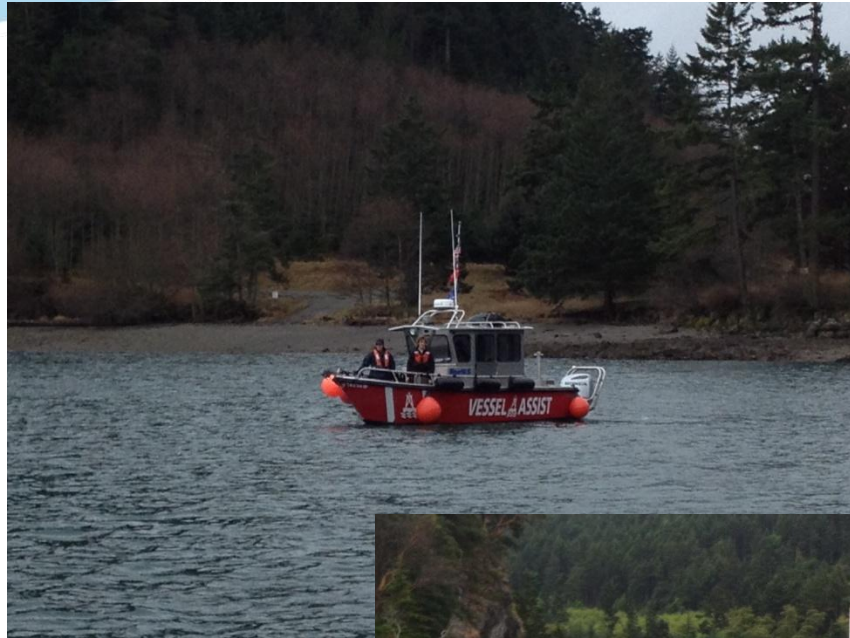
*Volunteer Your Vessel!*

*[www.oilspills101.wa.gov](http://www.oilspills101.wa.gov)*

# WHAT ARE VOO?

- Vessels of Opportunity (VOO) may be local commercial or recreational vessels identified to assist in responding to large oil spills.
- VOO supplement the system of organized, professional spill responders that we already have in place throughout the state.

# EXAMPLES OF VOO VESSELS

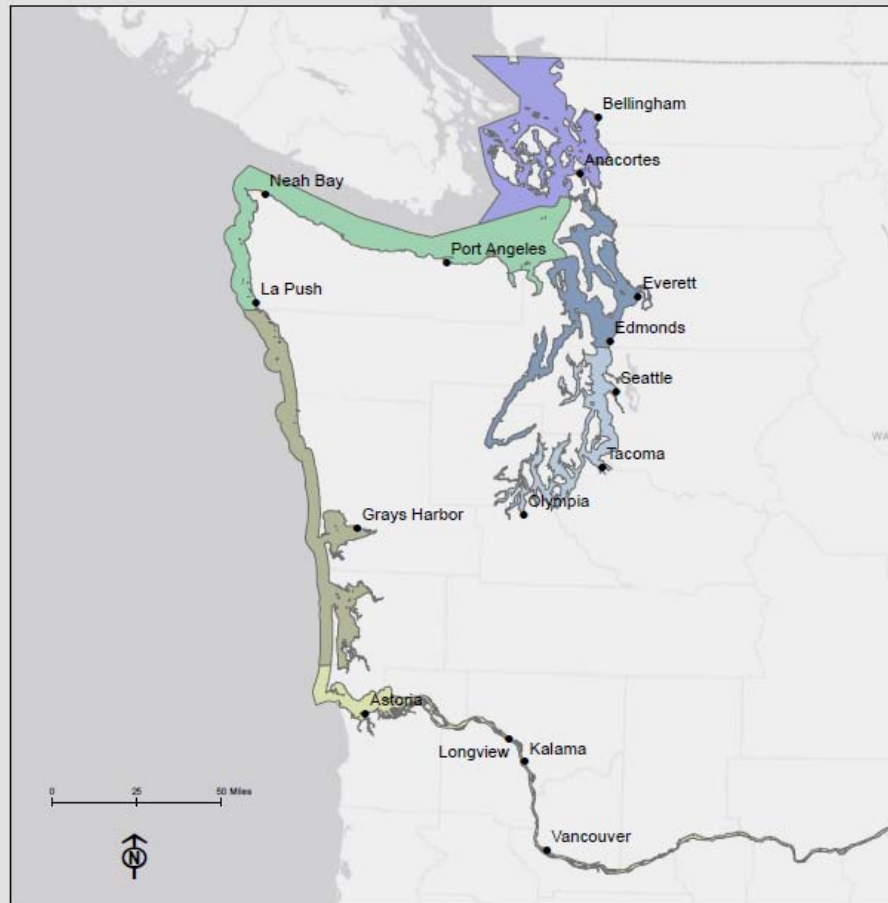




# HOW DOES IT WORK?

- Washington state recently passed regulations which require contingency plan holders to plan for the use of VOO.
- Under the regulation Ecology manages a VOO registration database: [www.oilspills101.wa.gov](http://www.oilspills101.wa.gov).
- Interested vessel owners can register in the database and give information on their boat.
- The information is used by regulated industry to identify the vessels they will contract to meet the regulatory requirements.

# WHERE WILL VOO BE USED?



NOTE: In the event of a spill VOOs from any region may be called to the site to assist with the response.

## Legend

### Region

- 1- Strait of Juan de Fuca
- 2- San Juan Islands/ North Puget Sound
- 3- South Puget Sound and Central Puget Sound
- 4- Columbia River
- 5- Admiralty Inlet/ Hood Canal and North Central Puget Sound
- 6- Grays Harbor

Region	Proposed Number of Tier 1 Vessels
1	18
2	12
3	12
4	18
5	12
6	12

# PARTICIPATION COMMITMENT?

- Tier 1 VOO means you are ready to be contracted before an emergency situation happens. If selected as an active VOO, you will receive training, participate in drill exercises, be assigned specific tasks during an emergency response, and be paid for your time.



# PARTICIPATION COMMITMENT?

- Tier 2 VOO is a list of volunteers that Ecology will maintain, to be contacted in the event of a big spill.
- Tier 2 VOO will receive training just in time to support response efforts.
- Signing up in the database managed by Ecology guarantees your spot as a TIER 2 VOO.

# HOW WILL I BE COMPENSATED?

- The contracting company will set the terms and qualifications you must meet to be eligible for participation. The company will likely assess your vessel's current location, certifications, general vessel condition, indicated level of VOO participation, and other important factors.
- Contracts are between the vessel owner and the contractor – Ecology does not participate in contracts.

# WHAT CAN VOO DO?

- VOO support oil spill response.
  - Enhanced skimming
  - Protection booming
  - Logistical support
- VOO may become oiled while supporting oil spill response.
- If your VOO becomes oiled there will be a plan to clean your vessel.



# VOO support recovery operations!



# VOO support enhanced skimming!





# VOO can deploy protection strategies!





# VOO can support logistics!



VOO can search for injured or oiled wildlife.!



# GREAT! HOW DO I SIGN UP?

- Log onto [www.oilspills101.wa.gov](http://www.oilspills101.wa.gov)





# GREAT! HOW DO I SIGN UP (cont)?

- Click “Vessels of Opportunity” on the title menu



The screenshot shows the homepage of the [oilspills101.wa.gov](http://oilspills101.wa.gov) website. The header features a banner with the text "oilspills101.wa.gov" and "DEPARTMENT OF ECOLOGY State of Washington". Below the banner is a navigation menu with links: Home, Register, Volunteers, **Vessels of Opportunity**, Training, Partner Agencies, Sign In, and Contact Us. The main content area is titled "Vessel of Opportunity Program (VOO)" and contains a paragraph explaining the program. Below the paragraph are two main links: "Read more about becoming a VOO" and "Start the registration process for becoming a VOO". The latter link has two sub-links: "Step 1: Register for a VOO Account" and "Step 2: Complete the Vessel Information Survey".

oilspills101.wa.gov

sponsored by: DEPARTMENT OF ECOLOGY State of Washington

Home Register Volunteers **Vessels of Opportunity** Training Partner Agencies Sign In Contact Us

## Vessel of Opportunity Program (VOO)

Vessels of Opportunity (VOOs) may be local commercial or recreational vessels identified to assist in responding to large oil spills in Washington, a rare but potentially devastating occurrence. Vessel owners who volunteer to be VOO will supplement the system of organized, professional spill responders that we already have in place throughout the state. All vessel types are welcome to volunteer; fishing, charter, deck barges or other types of smaller passenger and pleasure boats.

- » Read more about becoming a VOO
- » Start the registration process for becoming a VOO
  - Step 1: Register for a VOO Account
  - Step 2: Complete the Vessel Information Survey

# GREAT! HOW DO I SIGN UP (cont)?

- Provide your contact information to complete Step 1 in the registration process.



The screenshot shows the registration page for oilspills101.wa.gov. The header features the website name, a logo for the Department of Ecology, and a navigation menu. The main content area is titled 'Register' and includes instructions for new users. A search bar with a 'GO' button is located in the top right. The registration form includes a dropdown menu for selecting a group, followed by text input fields for first name, last name, email, and address. Red asterisks indicate required fields.

oilspills101.wa.gov

DEPARTMENT OF ECOLOGY  
State of Washington

Home Register Volunteers Vessels of Opportunity Training Partner Agencies Sign In Contact Us

GO

### Register

To register, please complete the following form. Choose the group you are registering with first.

\*\*\*If you would like to register in more than one volunteer role, please [click here](#) to set the form for multiple volunteer role registrations.\*\*\*

If you are registering as a Regulated Plan Holder or Primary Response Contractor you will be assigned a password by the site administrator who will send it to you by email. If you are registering as any other group you will assign your own password at the time of registration.

Already Registered? [Sign In](#)

Marked \* fields are required

I belong to the following group \*

First Name \*

Last Name \*

Email \*

Address \*

# GREAT! HOW DO I SIGN UP (cont.)?

- Complete Step 2 by filling out the vessel survey.



The screenshot shows the website **oilspills101.wa.gov**, sponsored by the **DEPARTMENT OF ECOLOGY** of the **State of Washington**. The page is titled **Vessel of Opportunity Survey - Commercial**. It includes a navigation bar with links: Home, Register, Volunteers, Vessels of Opportunity, Training, Partner Agencies, Sign In, and Contact Us. A search bar with a **GO** button is also present. The main content area contains the following text:

Thank you for your interest in working with the Vessel of Opportunity program. **This survey is for Commercial Vessels.**

**Looking for the Recreational Vessel Survey?**

Please make sure to **register for a VOO account** in addition to completing the Vessel Information Survey.

If information about your vessel changes, you will need to complete another survey to update detail information about your vessel.

**Marked \* fields are required**

**This vessel is: \***

- ☐ Commercial
- ☐ Recreational

**First Name (Vessel Owner/Operator) \***

**Last Name (Vessel Owner/Operator) \***

**Name of the Vessel? \***



# ANYTHING ELSE?

- You must keep your information up-to-date by verifying your information in the database annually.



# QUESTIONS?





# Responding to Oil or HazMat Release

## What should you do first?





# Oil or Chemical Release

- Emergency Response

- Secure and deny entry
- Goal - Stabilization
- Limited planning
- All rules apply
- Health and Safety apply
  - Air monitoring
  - PPE
  - Work zones
  - etc.
- Incident/After Action Report

- Clean-up/Removal Action

- Less time critical
- Goal – Return to normal
- Definite Planning Phase
- Formal work plans
- HASP
- Data management
  - Air monitoring
  - Sampling
- Possible re-construction
- Draft and Final Report

# General Emergency Spill Response Actions

- Establish ICS (Regulatory requirement)
- Secure and Deny Entry
- Assess the Situation/size-up
- Match response with Resources
- Stop the Product Flow
  - Use common sense; act quickly; shut off pump; close valve; damage control measures
  - **SAFETY OF PERSONNEL IS PARAMOUNT**
- Warn People in Immediate Vicinity
  - Evacuate, if necessary
  - Enforce “NO SMOKING”
- Shut Off Ignition Sources
  - Extinguish flame
  - Check for motors, electrical circuits, etc.

# General Emergency Spill Response Actions

- Contain the Spill
  - Block off drains, culverts, ditches
  - Surround product with earth, straw, sand, boom sorbents
  - Get ahead of leading edge: what's down stream, ID sensitive areas, Geographic Response Plan
- Obtain Required Assistance from Others
- Notify Applicable Government Agents
- Commence Recovery, Clean-up and Restorative Actions



# Health and Safety

- Personnel Protection
- Work Zones
- Site Safety Issues
  - Hypothermia/Heat Stress
  - Slips/Trips/Falls
  - Fire
  - Boat Safety/Drowning
  - Currents/Water Flow
  - Biological hazards



## General clean-up/removal Spill Response Actions

- Planning Phase
- Execution Phase
- Data Management
- Draft and Final Reporting

# Planning Phase

- Resources management
  - Contractors & Sub-contractors
  - Public assets/Utilities
  - Support Functions
  - Disposal Arrangements
  - Engineering/Specialists
- Permission for access
  - Governmental/Tribal
  - Private Party
- Work Plan/Scope of work
- Health and Safety/HASP
- Sampling Plan
- Data Management Plan
  - Lab Data
  - Air Monitoring Data
  - GPS/GIS - Maps



# Execution Phase

- Establish ICS
- Coordination of Resources and Schedules
  - Stake holders
  - Costs
  - Many Missions
    - Environmental/Species
    - Cultural
    - Archeological
- Health and Safety/Training
  - Worker Safety
  - Public Safety
  - Environmental Protection
- How Clean is Clean
  - Data management
  - What are the benchmarks
  - Cost vs. Benefit
- Return to Normal
  - Cost vs. Benefit
  - Real World Realities

# Data Management Phase

- Air monitoring data
- Sample results data
- GPS/GIS data
- Labor/Personnel data
- Equipment Scheduling/maintenance Data
- Funding/Cost data Tracking

# Draft and Final Report

- Parties responsible
- Objectives of the report
- Structure/format of the report
- Distribution
- Lessons Learned



Questions-Discussion-Comments

# Additional Issues on Spill Response

Notifications, First Responder Liability,  
NRDA/ESA, Who Pays for Response?

# Reporting Requirements and Notification of Tribes

24-hr Tribal Hazmat & Oil Spill Awareness  
Course





# Ultimate Goals



- Preventing or minimizing catastrophic releases of toxic, reactive, flammable, or explosive chemicals
- Avoid situations that could result in toxic conditions, fires, explosive hazards, and/or offsite consequences
- Protect Human Health & the Environment

# Emergency Release Notification (EPCRA 304)

## HazMat Releases and Reportable Quantity (RQ)

- Use EPA's **List of Lists**
- Quantity released within 24-hour period
- Must be reported immediately upon knowledge of exceedance of an RQ

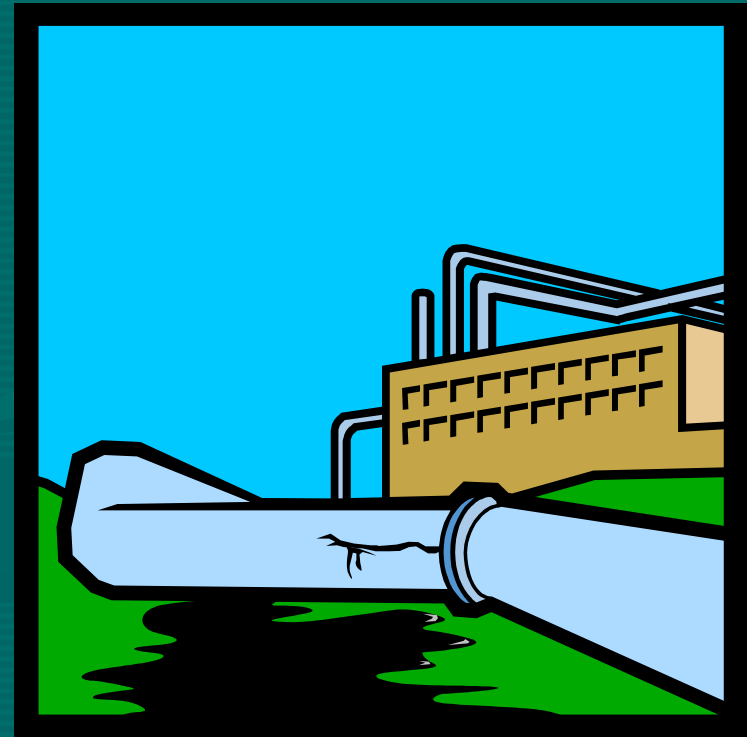
## Oil Releases

- Oil which causes or threatens to cause sheen on navigable water



# Emergency Release Notification

- The owner/operator (person in-charge) of a facility has the ultimate responsibility for reporting releases.
- This is a duty that cannot be delegated to someone else, e.g., fire chief
- The public can also report a release, but it does not fulfill the facility's obligation
- Definition of "facility" for Section 304 includes transportation





# Emergency Release Notification

## Immediate Notification:

- Made first to 911
- Subsequent immediate notification to NRC, LEPC and SERC

# Emergency Release Notification

Three organizations that must be called for an Initial Release Notification:

- State Emergency Response Commission (SERC) of any state(s) likely to be affected by release
- Local Emergency Planning Committee (LEPC) of any area(s) likely to be affected by release
- National Response Center (NRC)

# Notification to Trustees and Tribes

- NRC notifies EPA or Coast Guard Duty Officer (depending on jurisdiction).
- If the spill occurs on or impacts Tribal lands or resources, Duty Officer will call Tribal contact as listed by BIA.
- Duty Officer also contacts Federal Trustees (Dept. of Interior, NOAA, Dept. of Agriculture) if it impacts Trustee resources or lands.



# Emergency Release Notification

## Contents of Notification

- Chemical name or identity, and whether substance is extremely hazardous
- Estimate of quantity released
- Time and duration of release
- Media into which release occurred (water, air, soil)
- Known and anticipated health risks
- Health and safety precautions
- Facility contact person information

# EPA Notifications/Responses

- EPA Region 10 receives approximately 2,000 calls per year thru EPA Spill Line & National Response Center.
- Majority of responses managed by local and State emergency responders.
- EPA Region 10 conducts roughly 30 responses per year (dispatching FOSC & ER contractors).







# FIRST RESPONDER ENVIRONMENTAL LIABILITY FOR EMERGENCY RESPONSE ACTIONS



# The question is:

Can emergency responders undertake necessary emergency actions in order to save lives in dire situations without fear of environmental liability even when such emergency actions may have adverse environmental impacts?



# Background - Nerve Agent Drill

- Federal government sponsored a multi-agency nerve agent drill based on a simulated nerve-agent attack.
  - The release resulted in hundreds of simulated casualties who survived the initial attack.
- Hazmat Team had to rescue and decontaminate these “survivors” before they could receive medical attention.
- Hazmat Team identified the need to collect the water used to decontaminate the victims to avoid a release to the environment.







➤ Hazmat Team delayed their initial entry for more than an hour, awaiting the arrival and set-up of pools to collect decontamination water.

- “Survivors were dying a slow, painful, Convulsive death.
- Federal and State officials were debating and insisting that decontamination water had to be collected for proper disposal.



➤ By the time rescuers set up the holding pools and entered the site, nearly 90 minutes later, the “survivors” had expired.

➤ The contaminated water was collected but the “victims” died.





# “Good Samaritan” Provisions

## ➤ CERCLA Section 107(d)(1)

- No person shall be liable . . . as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the National Contingency Plan (NCP) or at the direction of an On-Scene Coordinator (OSC) . . . .

## ➤ CERCLA Section 107(d)(2)

- State and local governments are not liable . . . as a result of actions taken in response to an emergency created by the release or threatened release of a hazardous substance generated by or from a facility owned by another person . . . .



## ➤ CERCLA Section 107(d)(1)

- Does not preclude liability for costs or damages as a result of negligence.

## ➤ CERCLA Section 107(d)(2)

- Does not apply to costs or damages caused by gross negligence or intentional misconduct by the state or local governments.



# Other Liability Issues and State Tort Law



- EPA cannot prevent a private person from filing suit under CERCLA.
  - But, first responders can use Good Samaritan provision as defenses to such an action.
- First responders could also be subject to actions under other laws, including tort laws which allows individuals and businesses to seek compensation for losses or harm caused by another.
- First responders should consult legal counsel in their state to discuss authority, status as an agent of the state, immunities, and indemnification.



➤ Fourth Amendment (United States Constitution):

- The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon reasonable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

➤ Exigent circumstance

- There are "exigent circumstances" exceptions to the warrant requirement.
  - May arise when a first responder has reasonable grounds to believe that there is an immediate need to protect their lives, the lives of others, their property, or that of others.



## In Summary . . .

- Good Samaritan provisions may apply to a release or a threatened release of a hazardous substance, pollutant, or contaminant, as well as biological, chemical, and nuclear releases.
- First responders should undertake any necessary emergency actions to save lives and protect the public and themselves.
- Once any imminent threats to human health and life are addressed, first responders should be doing everything reasonable to prevent further migration of contamination into the environment.
- First responders should involve federal (and state) officials as soon as possible to reduce potential liability concerns.





## In Summary . . .

- EPA will not pursue enforcement actions against state and local responders for the environmental consequences of necessary and appropriate emergency response actions.
- First responders would not be protected under CERCLA from intentional contamination such as washing hazardous materials down the storm-sewer during a response action as an alternative to costly and problematic disposal or in order to avoid extra-effort.
- First responders should consult legal counsel in their state to discuss authority, status as an agent of the state, immunities, and indemnification.



# Questions?



# Other Processes Involving Tribes

Hazardous Waste Operations and  
Emergency Response 24-hour Training



# Other Processed Involving Tribes

- Natural Resource Damage Assessment (NRDA)
- Endangered Species Act (ESA) Consultation
- National Historic Preservation Act and Cultural Resources



# Natural Resource Damage Assessment (NRDA)

- After an oil spill or hazardous substance release, response agencies like the U.S. Environmental Protection Agency or the U.S. Coast Guard clean up the substance and eliminate or reduce risks to human health and the environment.
- These efforts may not restore injured natural resources. Through the NRDA process, trustee agencies conduct studies to identify the extent of resource injuries and the best methods for restoring those resources.



# NRDA

- Natural resource trustees determine whether injury to public trust resources has occurred.
- Their work includes collecting time-sensitive data to determine the extent and severity of injury. NRDA work may happen concurrently with response and cleanup.





# NRDA

- The NRDA effort is led by Federal Resource Trustee – either DOI or NOAA.
- Coordinate with Tribal, State and other Federal agencies.
- Response and NRDA efforts should be coordinated through the Unified Command



# Endangered Species Act (ESA) Consultation

- The ESA requires that Federal agencies ensure that their actions do not jeopardize listed species or adversely modify their designated critical habitat.
- For emergency spill response EPA normally enters into informal emergency consultation with Federal Resource Trustees during the response.



# ESA Consultation

- After the response is complete, formal consultation is required if response actions adversely impacted listed species or critical habitat.
- Informal emergency consultation during the response to avoid adverse impacts is preferred.





# National Historic Preservation Act and Cultural Resources

- National Historic Preservation Act (NHPA)
- The Archaeological Resources Protection Act (ARPA)
- The Native American Graves Protection and Repatriation Act (NAGPRA)



# National Historic Preservation Act

- Requires Federal agencies to evaluate the impact of all Federally funded or permitted projects on historic properties (buildings, archaeological sites, etc.).
- During emergency response where historic properties may be involved, we work directly with historic property specialists or Tribal archeologists.



# QUESTIONS?







## **Who Pays?**

# **Liability for a Chemical Release or Oil Spill**

**Richard Franklin, EPA OSC  
Mark Layman, WA Dept. of Ecology**

# “Polluter Pays” Principle



- ◆ One of EPA's top priorities is to get those responsible for the contamination to clean up the site.
- ◆ If the PRP cannot be found, is not viable, or refuses to cooperate, EPA, the state, or tribe may cleanup the site using Superfund money.
- ◆ EPA may seek to recover the cost of clean up from those parties that do not cooperate.



# OIL







# Oil Spill Liability Trust Fund (OSLTF)



- The OSLTF is used for costs not directly paid by the polluter (responsible party). The fund is also used to pay costs to respond to “mystery spills.”
- What the OSLTF can be used for:
  - ◆ Federal removal costs, including payment to cleanup contractors, overtime for government personnel, equipment used in removal operations, testing to identify the type and source of oil, disposal of oil and oily debris.
  - ◆ Claims for costs and damages such as natural resource damages, real/personal property, loss of subsistence use of natural resources

## OSLTF (cont)



- Who can access the OSTLF:
  - ◆ All Federal On-Scene Coordinators (FOSC)
  - ◆ Other Federal, State, Local, and Indian tribal government agencies assisting the FOSC get reimbursable funding authority via an FOSC-approved Pollution Funding Authorization (PRFA).
  - ◆ Natural resource trustees, including Indian tribal governing authority, to pay for natural resource assessments and restoration.
  - ◆ Claimants for uncompensated removal costs and OPA damages caused by the oil spill if the responsible party does not satisfy their claims.

## OSLTF (cont)



- Limitations to Accessing the OSTLF:
  - ◆ The discharge (or substantial threat of discharge) must be into or on the navigable waters of the US or adjoining shorelines
  - ◆ The discharge (or substantial threat of discharge) must be oil, which can include petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes.
  - ◆ The oil cannot include any substance which is specifically listed or designated as a hazardous substance under CERCLA.

# Pollution Removal Funding Authorizations (PRFAs)



- Other Federal, State, Local, and Indian tribal government agencies assisting the Federal On-Scene Coordinator (FOSC) get reimbursable funding authority via an FOSC-approved PRFA.
- Appropriate agency notifies EPA of the spill immediately.
- An FOSC visits the site and based on discussions between the FOSC and agency personnel, a brief work plan is written.
- Reimbursable activities are based on an FOSC-approved work plan.





# HAZARDOUS SUBSTANCES





# Local Governments Reimbursement (LGR) Program



- In the event of a release (or threatened release) of hazardous substances, EPA may reimburse local governments for expenses related to the release and associated emergency response measures.
- Determining Eligibility:
  - ◆ Federally-recognized Indian Tribes are eligible for reimbursement.
  - ◆ Applicant must have legal jurisdiction over the site where the incident occurred.
  - ◆ Reimbursement cannot be made to a responsible party.
  - ◆ Incidents involving petroleum products including petroleum, natural gas, crude oil, or any other specified fractions thereof that are not specifically designated as CERCLA hazardous substances do not qualify under this program. Some mixed waste may be allowable.

## LGR (cont)



- Requirements for Reimbursement:
  - ◆ Reimbursement cannot supplant local funds normally provided for a response.
  - ◆ Cost recovery must be pursued prior to applying for reimbursement.
  - ◆ Detailed cost documentation must be submitted with the application.
  - ◆ The application must be signed by the chairperson of a federally-recognized Indian Tribe.
  - ◆ Applications must be submitted to EPA within one year of the “date of response completion” of the response.



## LGR (cont)



- What costs are reimbursable:
  - ◆ Disposable materials and supplies used during a specific response
  - ◆ Rental or leasing of equipment used for a specific response
  - ◆ Special technical services and laboratory costs
  - ◆ Services and supplies purchased for a specific evacuation
  - ◆ Payment of unbudgeted wages for employees responding to the specific incident (e.g., overtime pay for response personnel)



# Questions?

# Oil by Rail and Emerging Energy Transportation Risks

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Department of Ecology  
Spill Prevention, Preparedness, and Response Program

# Emerging Risks:

## Recent NWRRT Task Force

- **Tar Sands / Oil Sands Products**
  - Alberta, Canada



- **Bakken Crude Oil**
  - North Dakota





# The Chemistry of Crude Oil

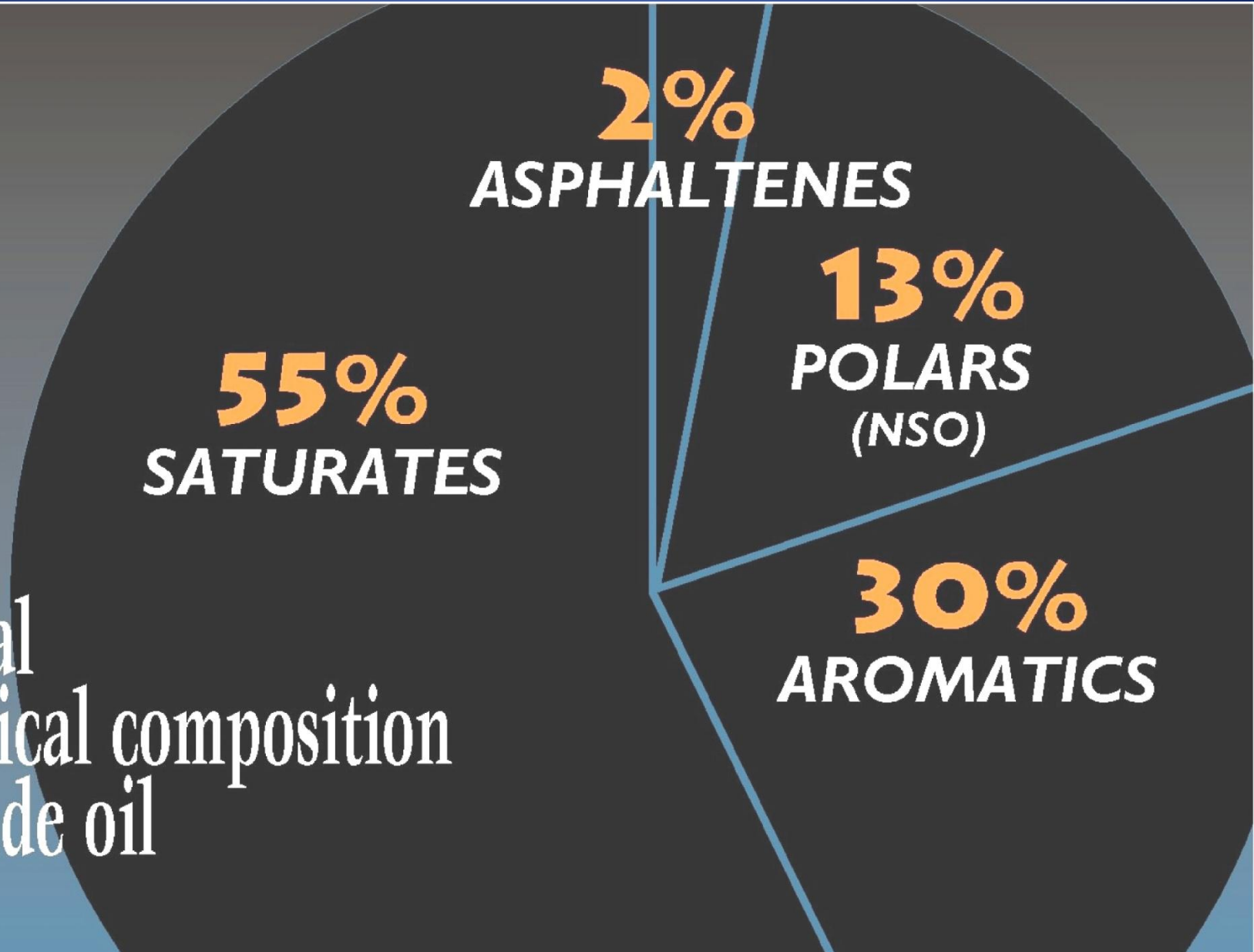
typical  
chemical composition  
of crude oil

**55%**  
**SATURATES**

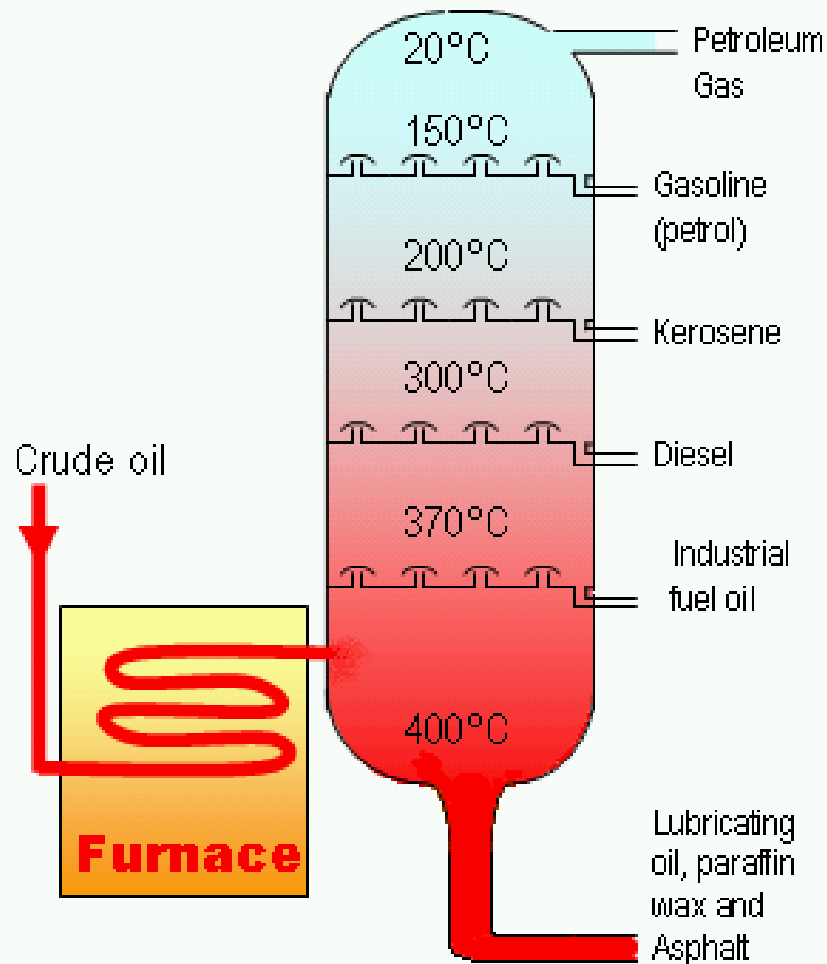
**2%**  
**ASPHALTENES**

**13%**  
**POLARS**  
(NSO)

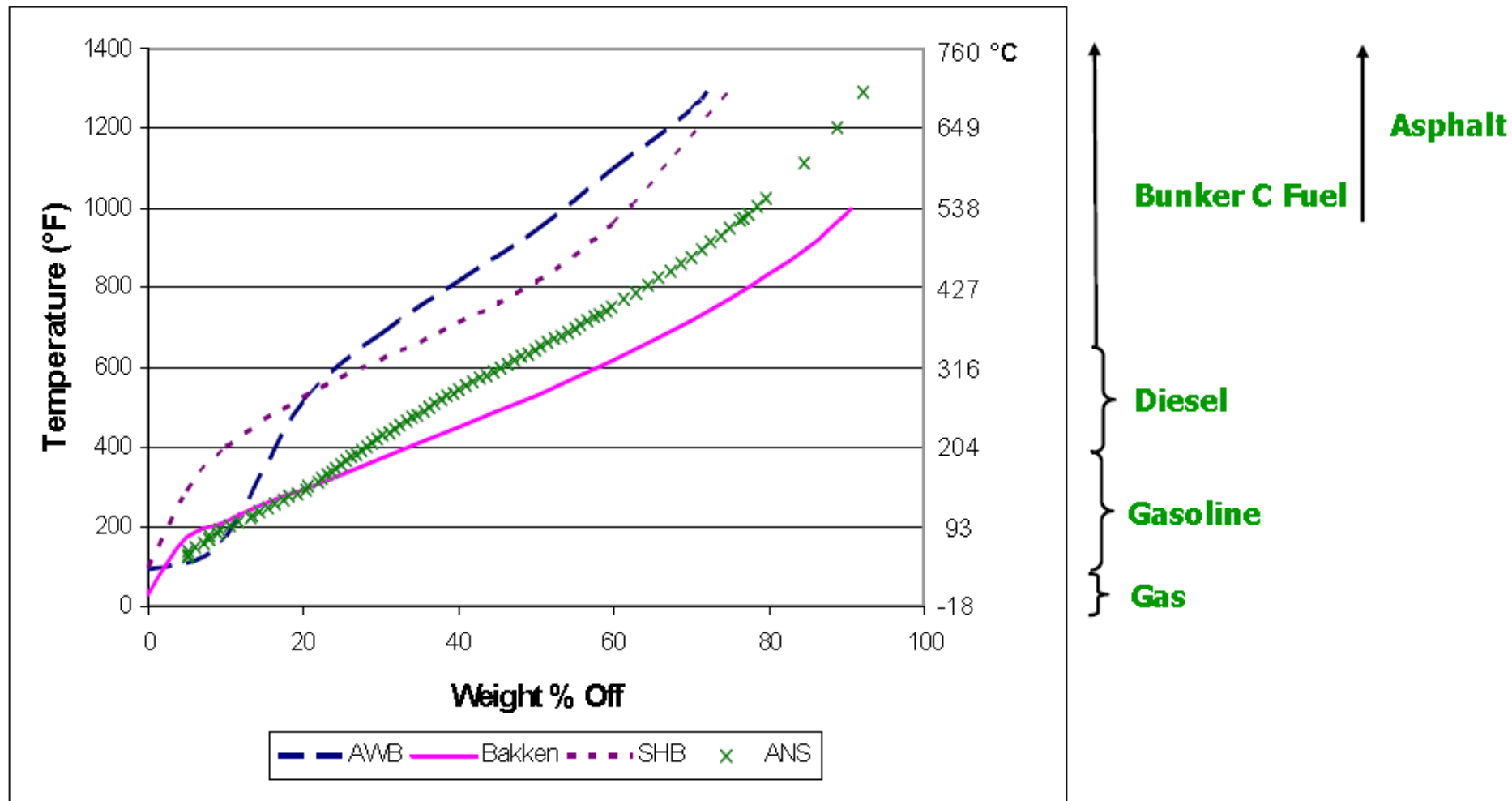
**30%**  
**AROMATICS**



# Refining Crude Oil into Stuff We Use



# Boiling Ranges of Petroleum Products



Access Western Blend Dilbit (AWB)      Surmont Heavy Blend Synbit (SHB)  
Bakken and Alaskan North Slope (ANS) are included for comparison

CanmetENERGY





# Oil Sands Products









Glacial  
Till

Oil Sands

# Typical Ore

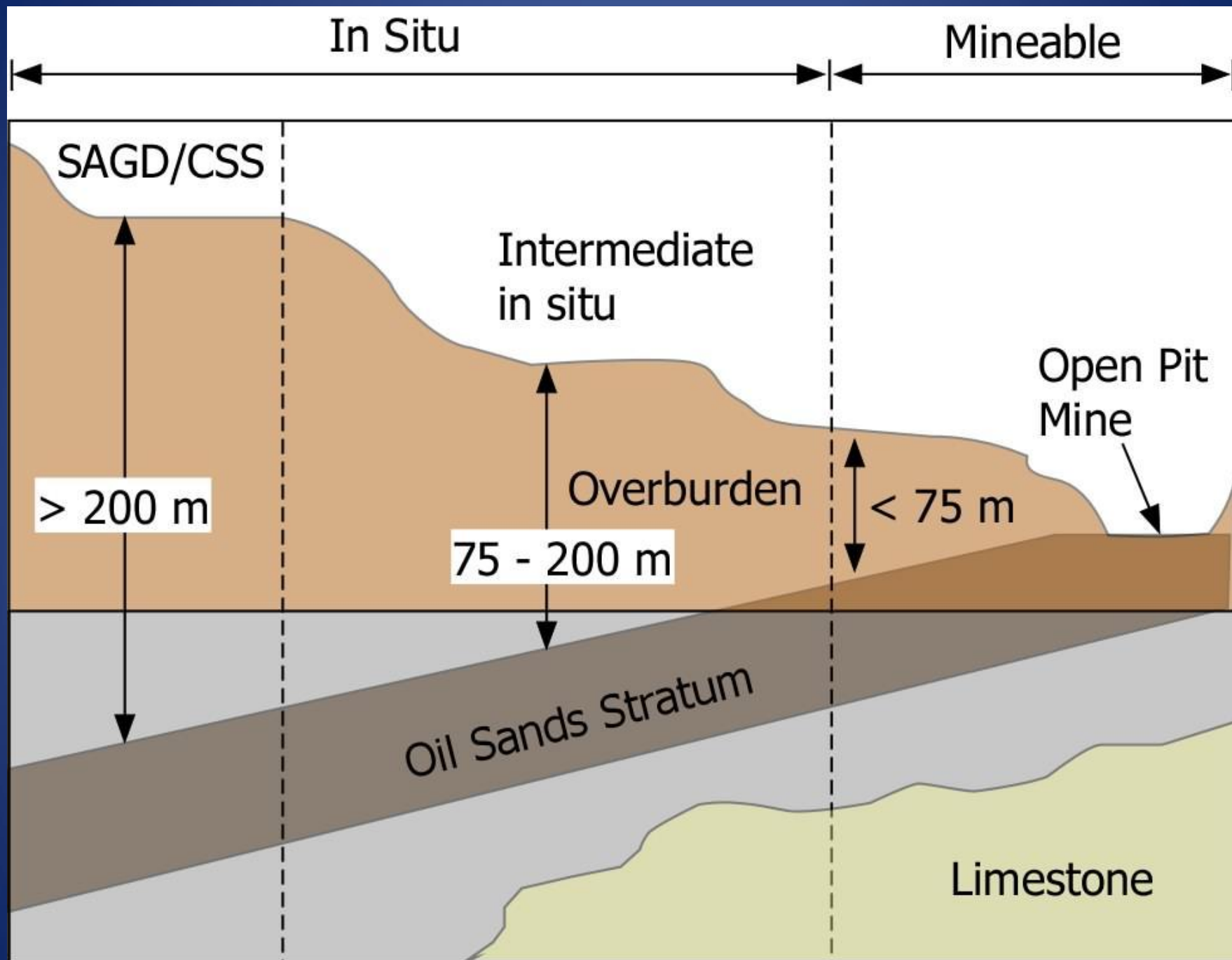
- 73% sand
- 10% fines
- 12% bitumen
- 5% water

# Range

- 55-80% sand
- 5-34% fines
- 4-18% bitumen
- 2-15% water

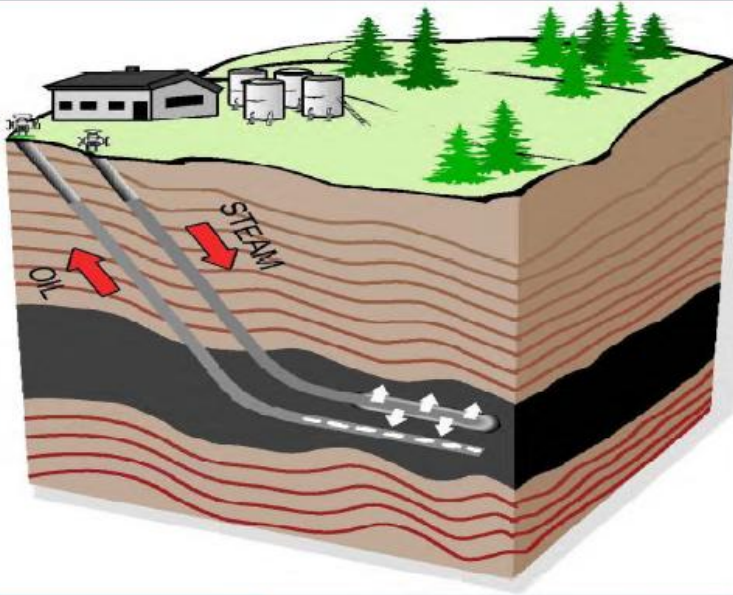


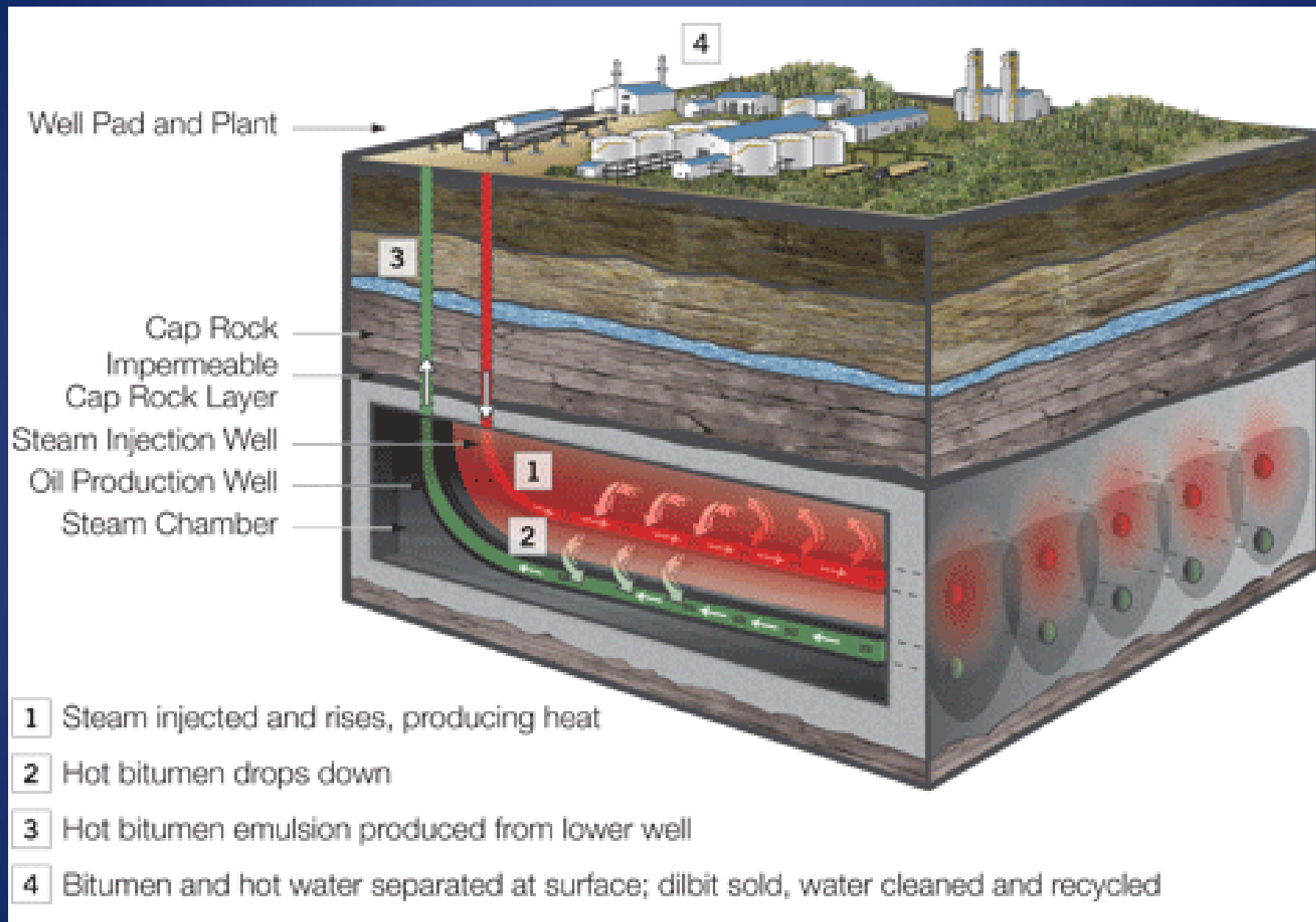






# Surface mining vs. in situ production









# Oil Sands Products:

## Definitions

- Oil sands/(tar sands): Naturally-occurring combination of bitumen, clay, sand, and water
- Bitumen: Semi-solid raw petroleum product resulting from in-situ partial biodegradation of crude oil reserve
- Diluent: Any lighter viscosity petroleum product used to dilute bitumen for transportation
- Dilbit: Diluted bitumen, bitumen mixed with any diluent for transport
- Synbit: Bitumen combined with synthetic crude oil
- Dilsynbit: Synbit combined with a diluent





# Bakken Crude Oil





Regina

Winnipeg



Bakken

Bismarck

Fargo

Duluth

Rapid City

Minneapolis  
St. Paul



Roy Luck





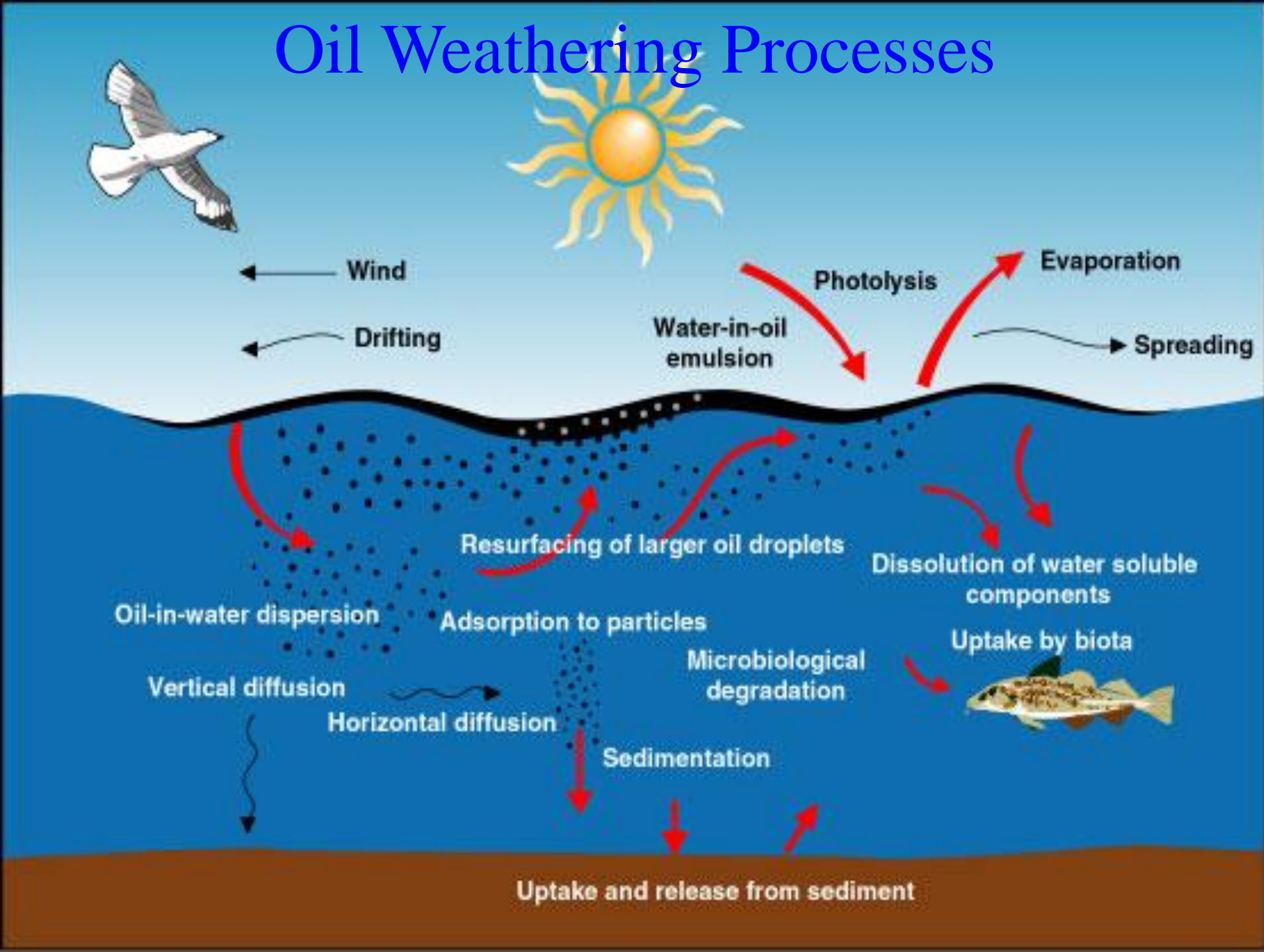
# Some Oil Properties We Care About...

- *Density*
- *Viscosity*
- *Pour point*





# Oil Weathering Processes



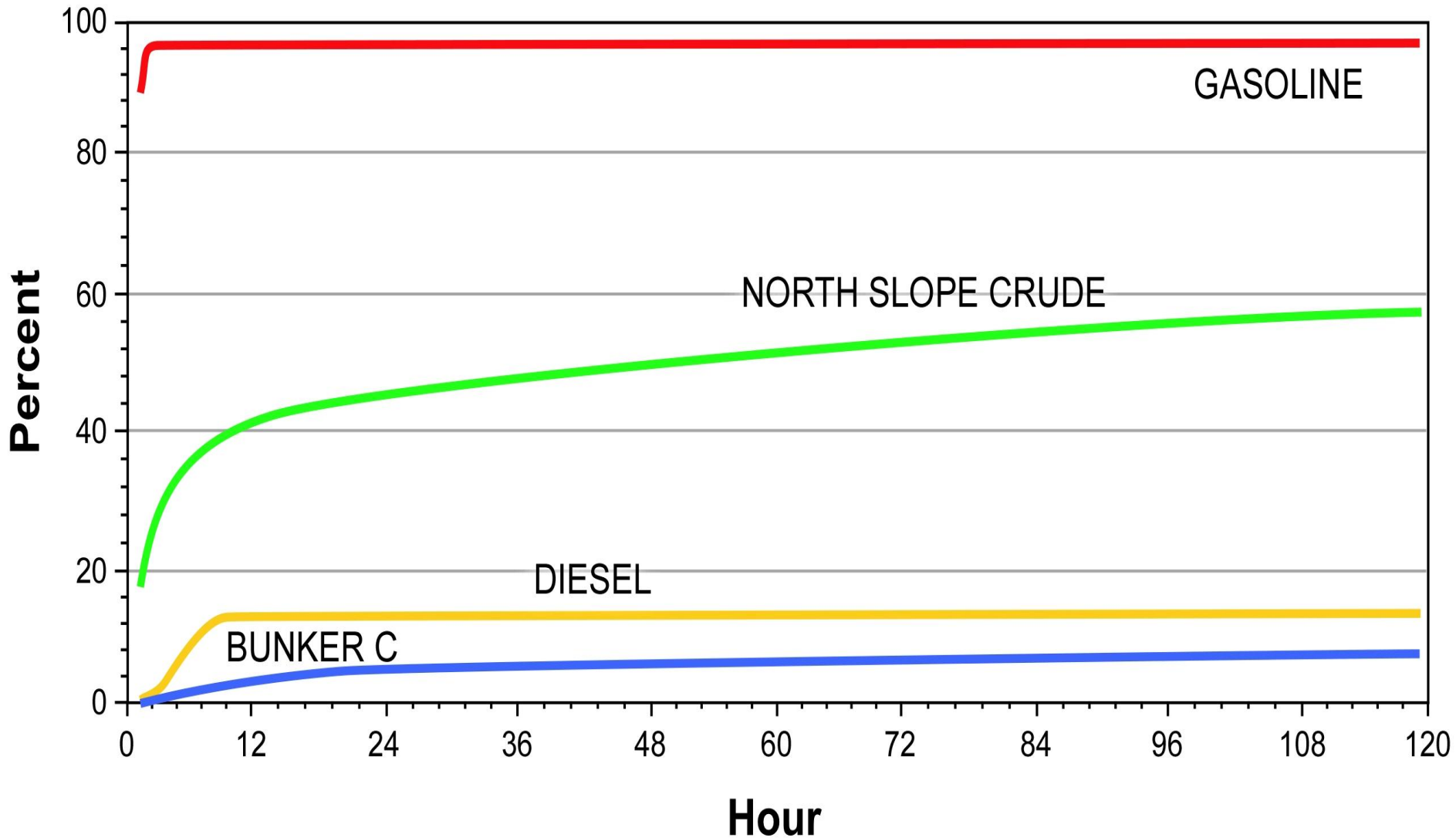
# Viscosity

<u>Liquid</u>	<u>Viscosity (cSt)</u>
Water	1
Kerosene	10
SAE 10 motor oil	100
Glycerin or castor oil	1,000
Corn syrup	10,000
Molasses	100,000
Peanut butter	1,000,000



# Evaporation by Oil Type

## OIL EVAPORATE1



# Routes of Exposure to Marine Life

- Air - Volatiles - Orcas, seals
- Sea surface - slicks - Fur, feathers, baleen
- Water Column -dispersed - eggs and larval acute mortality
- Shoreline - emulsion - fur, feathers,

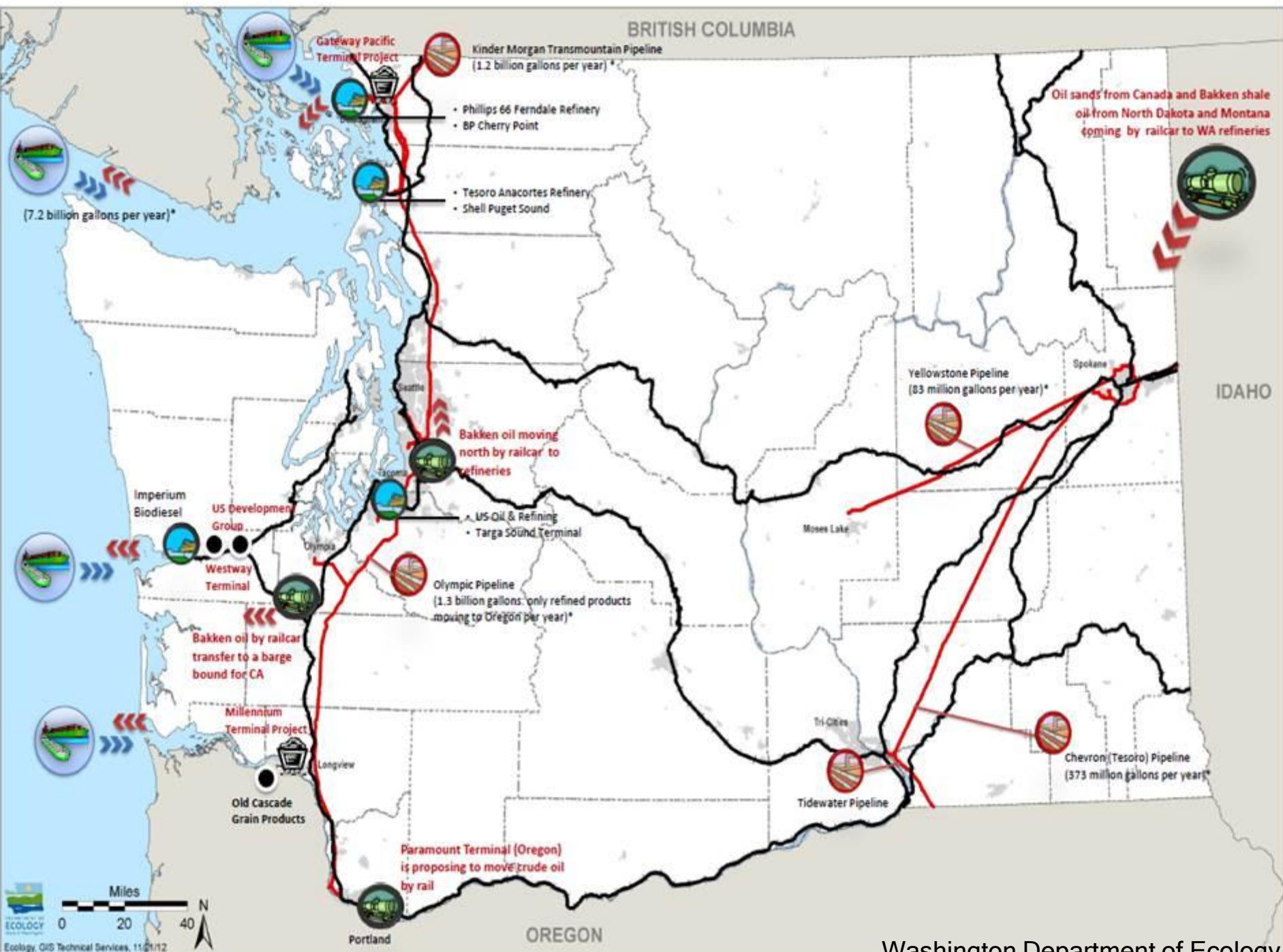
# How toxic are different oil types?

Different oil types have different physical properties, chemical composition and toxicity, and their behavior may depend on the environmental conditions at the time of the spill.



Oil type	Type I: Very Light	Type II Light	Type III Medium	Type IV Heavy
Examples	Gasoline	Diesel, jet fuel, and light crudes	Paraffin-based oils, most crude oils	No. 6. fuel oils, heavy crudes
Acute toxicity to aquatic organisms	High toxicity from soluble compounds	Moderate toxicity from soluble compounds	Moderate to low toxicity	Low toxicity, but high risk of smothering
Long term environ. effects	Likely not severe	May cause long-term intertidal contamination	May cause severe long-term impacts	Possible long-term sediment contamination
			Can severely impact bird, fur-bearing mammals, and shoreline habitats	





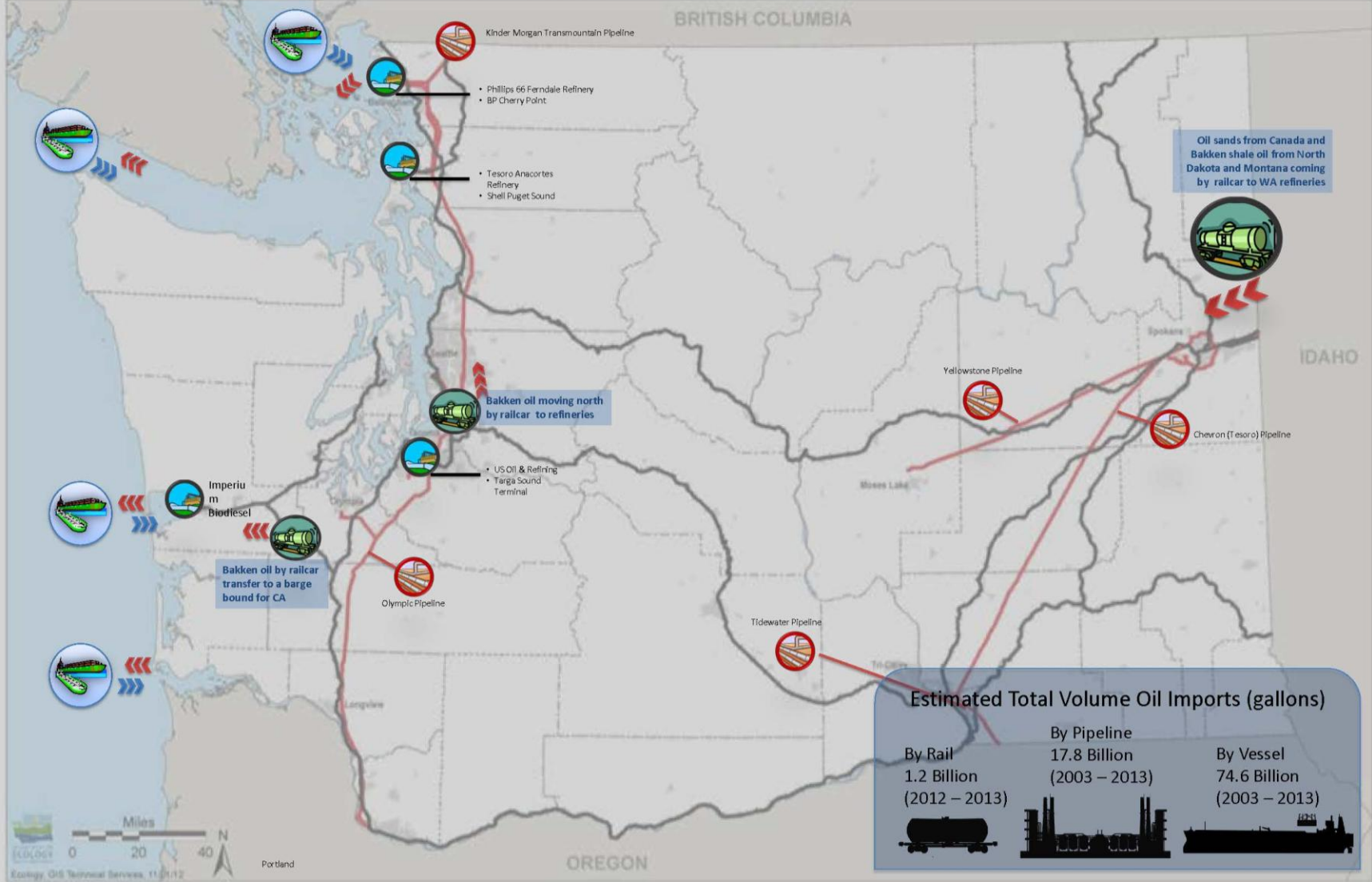
# Initial Response Hazards

Hazard	Dilbit	Bakken Crude	ANS Crude
Fire/Explosion	Yes – due to diluent	Yes	Yes - low
Benzene	Yes – high depending on diluent	Yes – high concentration up to 3%	Yes - low
Hydrogen Sulfide	Possibly – will need monitoring	No	Yes

# Air Monitoring and Air Sampling







## Data Assumptions

- Shipping 2008-2013: Aggregated data from the Advanced Notice of Transfer (ANT) system
- Shipping 2003-2007: Data reported to WSPA by industry (2004 is an estimate based on 2003 and 2005 data because reporting to WSPA is done every other year)
- Pipeline 2003 – 2013: Aggregated data reported by industry to the Washington State Department of Commerce (Data is from the Transmountain Pipeline)
- Rail 2012-2013: Estimate based on a number of factors including
  - Data on vessel transfers from ANT system
  - Total estimated throughput for Washington State refineries
  - Estimated pipeline throughput for each refinery
  - Predicted volumes transported by rail as reported by refineries
  - Estimated increases in total crude transported through Washington

## Estimated Annual Oil Imports (barrels)

\* 1 barrel = 42 gallons

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Vessel	185,785,000	174,216,856	180,675,000	178,156,500	170,820,000	164,501,163	165,234,154	132,649,298	147,038,612	140,975,573	136,857,556
Pipeline	18,460,391	30,783,144	25,998,188	31,141,392	38,900,433	42,342,972	38,075,318	47,925,823	51,830,000	49,417,963	49,170,819
Rail	0	0	0	0	0	0	0	0	0	12,123,256	16,971,625



# Overview of Refineries, Facilities, and Proposed Facilities for Crude Oil by Rail – June 2014



# CRUDE BY RAIL (CBR) – IN-OPERATION FACILITIES AND PROPOSALS – STATUS AS OF 6/25/14

CBR Owner or Proponent	Location	Facility type, type of system, # of offload stations, throughput, new storage if any)	Status	Trains Offloaded at Facility/Train Trips In and Out per day
BP	Cherry Point	Refinery, Loop, 52 offload stations, ~146,000 bpd, no new storage	Receiving oil by rail as of 12/26/13. Whatcom Co. issued MDNS for rail expansion.	1/2 (in-operation)
Imperium	Grays Harbor	Terminal, ladder, Number of offload stations not identified in SEPA checklist, ~75,000 , up to 9 new tanks.	Existing biodiesel facility proposed to add CBR capability and additional liquid storage. Summary judgment remanding MDNS back to Ecology and City of Hoquiam by the SHB 11/12/13.	1/2
NuStar	Vancouver	Terminal, single track, 4 existing offload stations, possible expansion to 12 stations, ~41,000 bpd, convert existing tank for crude storage.	Proposal to convert 120,000 bbl methanol tank to crude oil tank and add rail offload capability. Ecology submitted comments on environmental checklist to SWCAA 2/6/14.	.3/.6
Phillips66	Ferndale	Refinery, ladder, 54 offload stations, ~75,000 bpd, no new storage	In construction with completion anticipated 4 <sup>th</sup> qtr 2014. Whatcom Co. issued MDNS 4/29/13 for rail expansion.	1/2
Shell	Anacortes	Refinery, Ladder, , ~75,000 bpd, new storage unknown.	Expansion proposed. SEPA process underway.	1/2
Targa Sound	Tacoma	Terminal. Ladder; 12 existing offload stations, 36 planned, ~75,000 bpd, 2 new tanks, 2 existing tanks modified.	DNS issued 12/2013 for rail expansion by City of Tacoma. Still completing permitting.	1/2
Tesoro	Anacortes	Refinery, Ladder, 100 offload stations, ~75,000 bpd, no new tanks.	Receiving Bakken oil since 9/2012. Skagit Co. issued MDNS 10/2011 for rail.	1/2 (in-operation)
Tesoro-Savage	Vancouver	Terminal, loop, 90 offload stations, ~292,000 bpd, 6 new tanks.	Proposed new site. EFSEC is SEPA lead. In EIS process	4/8
US Development	Grays Harbor	Terminal, Ladder, No information on system capabilities	Proposal still in discussion phase.	1/2
US Oil	Tacoma	Refinery, ladder, 64 existing stations, adding 48 additional stations, ~48,000 bpd, no new storage.	Receiving oil by rail at 60 stations as of 4/13. Permitting underway for project to increase the size of the rail facility. Construction expected in late 2014.	0.5/1 (in-operation)
Westway	Grays Harbor	Terminal. Ladder; 18 existing offload stations, planned increase to 76 stations, ~75,000 bpd, 4 new tanks.	Existing methanol terminal proposed to add CBR capability. Summary judgment remanding MDNS back to Ecology and City of Hoquiam by the SHB 11/12/13	0.6/1.2
<b>TOTAL</b>	<b>State</b>			12.4/24.8

# Emerging Energy Transportation Risks

## Oil by Rail Incidents – Bakken Crude

June 30, 1992 - Superior, WI

July 6, 2013 - Lac-Mégantic, Quebec

October 19, 2013 - Gainford, Alberta

November 8, 2013 - Aliceville, AL

December 30, 2013 - Casselton, ND

January 7, 2014 - Plaster Rock, New  
Brunswick

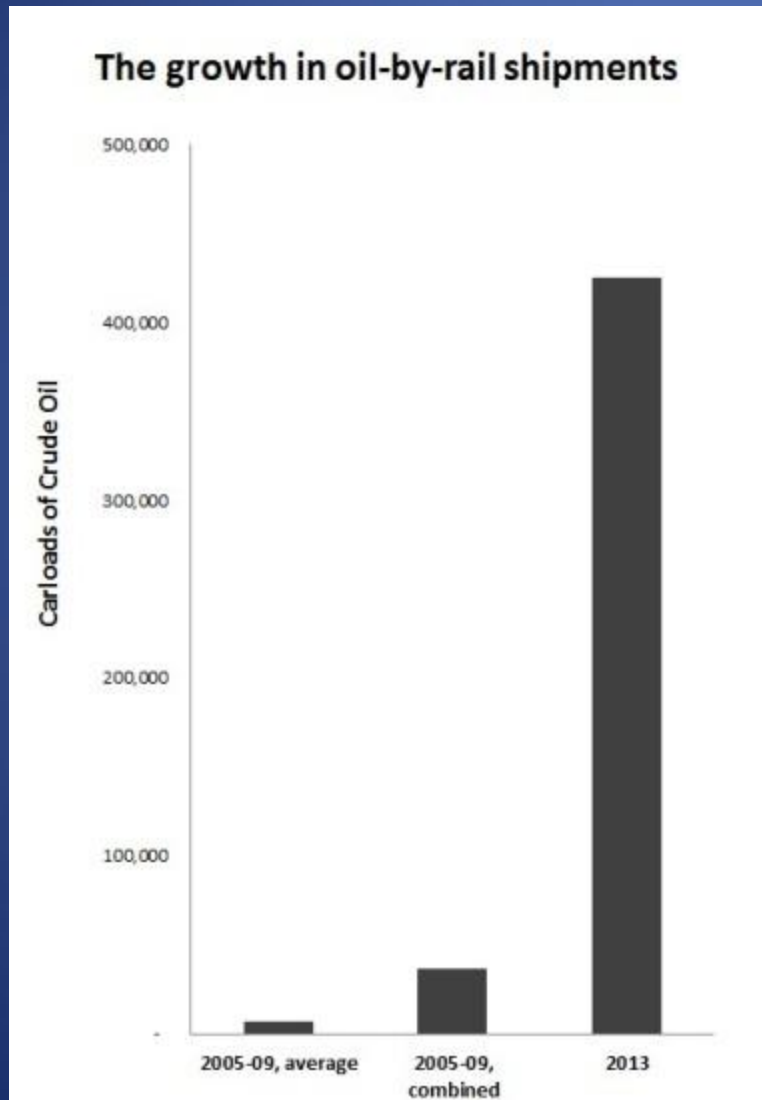
January 20, 2014 - Philadelphia, PA

April 30, 2014 - Lynchburg, VA





# Emerging Energy Transportation Risks



More crude oil was spilled in U.S. rail incidents in 2013 (1.15 million gallons) than was spilled in the previous four decades (0.8 M gallons).

This does not include the 1.5 million gallons spilled in Lac Megantic, Canada (July 2013) where 47 people died.



# Emerging Energy Transportation Risks

## Federal Jurisdiction Oil by Rail

### Federal Railroad Administration

- National railroad safety rules.

### Pipeline and Hazardous Materials Safety Administration (PHMSA)

- Issues rules and regulations governing the safe transportation of hazardous materials.

### Surface Transportation Board

- Railroad rates, mergers, sales, construction and abandonment.



# Emerging Energy Transportation Risks

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## Ecology Jurisdiction Oil by Rail

- Lead on spill prevention, preparedness, and response plans for vessels, facilities and pipelines .
- Regulates oil transfer facilities, but not rail transportation....this might change.
- Oversees regulation for construction and operation of oil refineries, storage and handling facilities (air and water permits, GHGs, waste handling, cleanup of contamination, CZM consistency).
- SEPA lead for new proposals to construct facilities that store over 1 million gallons of liquid fuel that do not fall under EFSEC jurisdiction.
- Lead state agency for spill response.

# Emerging Energy Transportation Risks

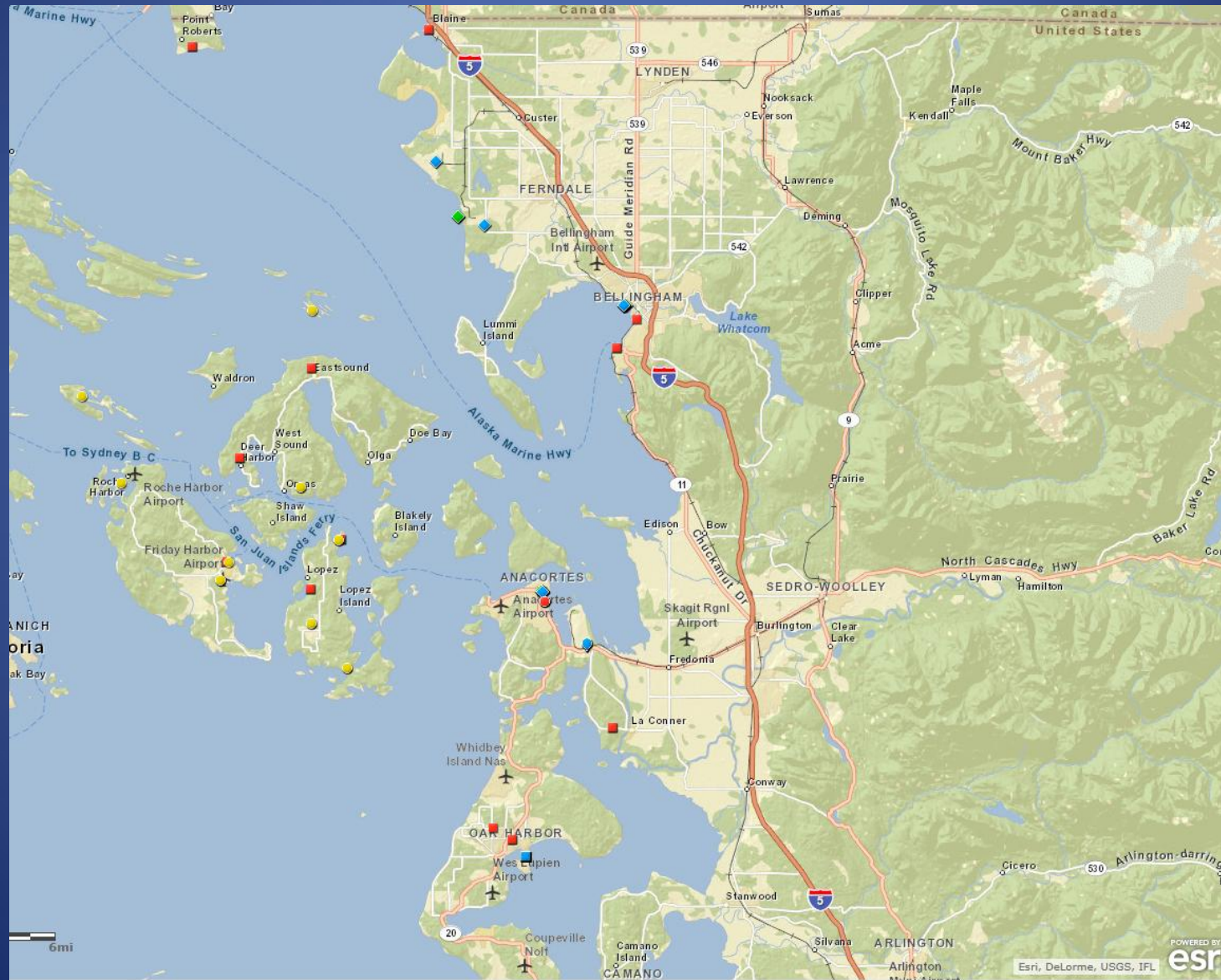
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## Identified Gaps – Ecology

- Lack of prevention and preparedness planning authority for rail
- Level of spill preparedness significantly different than maritime, pipeline and oil facilities in WA
- Oil property characteristics, community and responder safety and current response cleanup technology
- Potential decline in revenue to support Spills Program work
  - Crude coming into our refineries by ship is taxed
  - Crude coming by rail and pipeline is not taxed



# Specialized Response Equipment



# Emerging Energy Transportation Risks

## 2014 Legislative Outcomes

- 5 Project Positions (1-year only)
  - 2 positions to address risk mitigation and management both on the marine and inland waters
  - 3 positions for developing geographic response plans along inland waters\*\*
- Marine Rail Oil Transportation Study



\*\*New GRPS Include: Chehalis River, Clark/Cowlitz Rivers, Nisqually River, Green/Duwamish River, Lower and Middle Columbia, Moses Lake, Lake Washington, and Lake Chelan

# Marine and Rail Oil Transportation Study

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## WA GOVERNOR's Directive - June 14, 2014

- Characterize risk of accidents along rail lines
- Review state and federal laws and rules with respect to rail safety and identify regulatory gaps
- Assess the relative risk of Bakken crude with respect to other crude oils
- Identify data gaps that hinder improvements in public safety and spill prevention and response
- Begin development of spill response plans for impacted counties
- Identify potential actions that can be coordinated with neighboring states and British Columbia
- Identify, prioritize, and estimate costs for state actions that will improve public safety and spill prevention and response
- Propose funding strategy for Governor's 2015-17 budget

# Emerging Energy Transportation Risks

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## Marine/Rail Oil Transportation Study Stakeholders

- Tribes
- Local communities
- Local Emergency Planning Committees
- Environmental Advocacy Organizations
- Oil, rail and shipping industry
- Harbor Safety Committees
- Local fire departments
- Northwest Area Committee/Regional Response Team 10



# Emerging Energy Transportation Risks

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## Utilities and Transportation Division (UTC)

- WA Rail System: 28 RRs, 3000 miles of track, 2,700 public RR crossings
  - 10 million miles of traffic each year
- Grade Crossing Safety:
  - Approve new crossings and modifications
  - Inspection for compliance of federal standards
- Support the Federal Railroad Administration:
  - 4 FRA-certified inspectors to enforce hazmat, signal and train control, track, and operating practices
- Railroad Employee Safety: Inspect railroad yard walkways, overheads and side clearance rules
- Respond to Citizen Complaints: crossings, walkways and noise
- Rail Public Safety and Education: Operation Lifesaver WA State

# Emerging Energy Transportation Risks

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## State Military Dept.— Emergency Management Div. (EMD)

- EMD to reach out to and collect data from partners:
  - State Emergency Response Commission
  - Tribes
  - Local Emergency Planning Committee
    - Fire Departments and other Responders to include HazMat Teams
- State and Local Departments of Transportation
- State and Local Department Public Works
- Other Subject Matter Experts

# Emerging Energy Transportation Risks

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## Marine Rail Oil Transportation Study Deliverables

**September 1** – Preliminary Findings

**September & October** – Stakeholder Meetings

**October 1** – Draft Interim Report to Governor

**November 1** – 2<sup>nd</sup> Draft of Interim Report

**December 1** – Interim Report to Legislature

**March 1, 2015** – Final Report to Legislature

# Emerging Energy Transportation Risks

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More Information:

[www.ecy.wa.gov/programs/spills/oilmovement/index.html](http://www.ecy.wa.gov/programs/spills/oilmovement/index.html)

Questions?



DEPARTMENT OF  
**ECOLOGY**  
State of Washington



# Developing Cleanup Endpoints for Oil Spills

# Shoreline



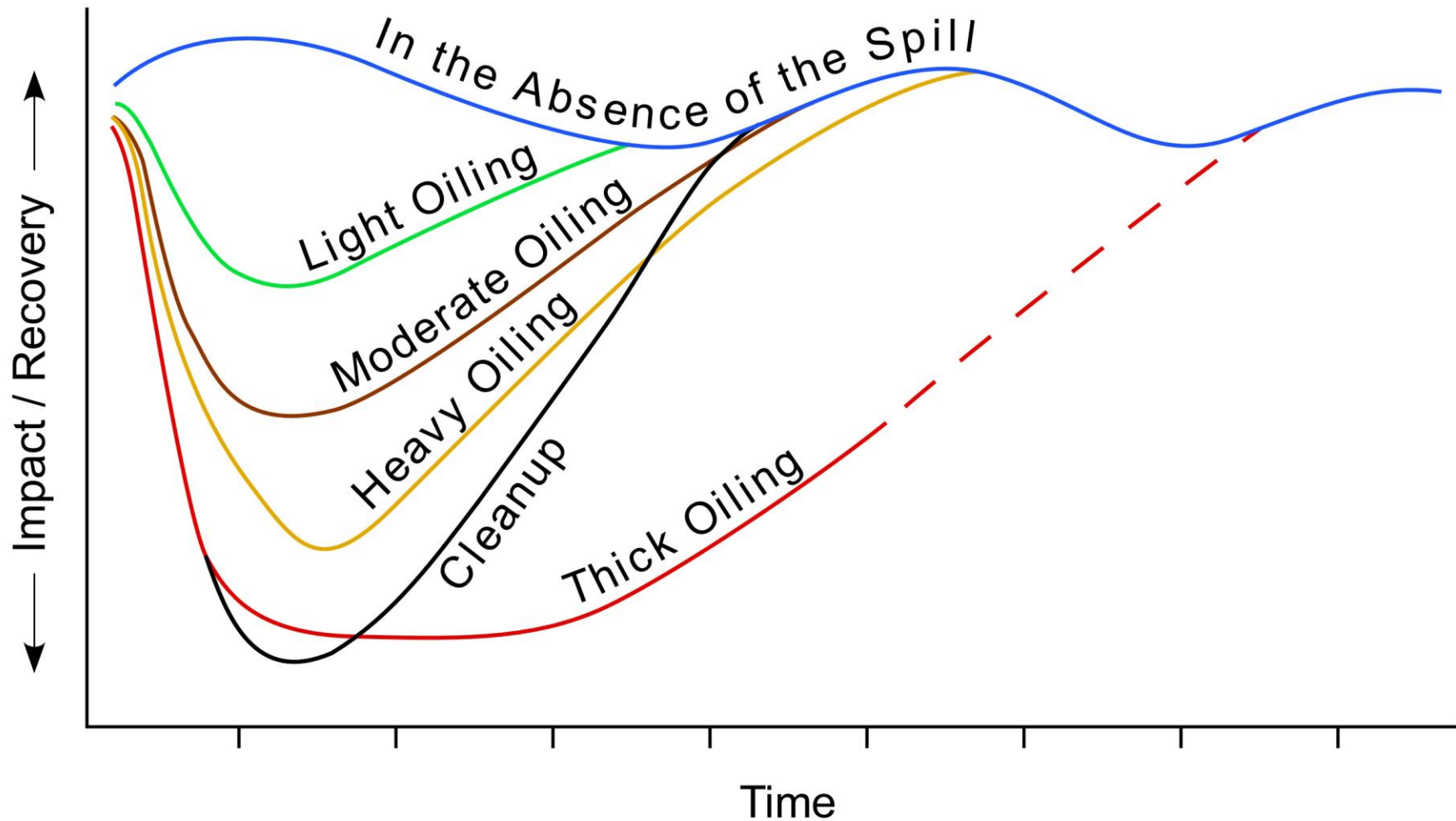




# New Orleans Riverwalk







# Influences on Endpoint Selection

- Type of shoreline
- Value of habitat and timing of use
- Operational feasibility
- Degree and type of oiling
- Net Environmental Benefit of treatment
- Anticipated rate of natural cleaning

# Net Environmental Benefit complications

- Many “sensitive” resources with competing priorities (drinking water, ESA-listed species, commercial waterways)
- Imperfect knowledge of what will really happen

# Basis for Treatment

- Protection of public health and safety
- Protection of sensitive resources and habitats
- Removing aesthetic impacts in high-use areas
- Removing contact hazard (humans/wildlife)
- Mitigating persistent sheens
- Mitigating intermittent sheens
- Mitigating sediment/soil contamination



# A Hierarchy of Cleanup Endpoints

- No visible oil
- No more than background
- No longer releases sheens that will affect sensitive areas, wildlife, or human health
- No longer rubs off on contact
- Oil removal to allow recovery without causing more harm than natural removal

# No Visible Oil

## Visual inspections preferred vs. chemical analyses:

- Sampling is difficult
- High variability
- Turnaround time for results
- Costs
- But...may be State water/sediment quality standards

# No More than Background

## Have to determine “Background”

- Almost never any historical data
- Inland areas have lots of legacy contaminants
- Chemical fingerprinting will often be required

# No Longer Releases Sheens that Affect Sensitive Resources

## Consider:

- 1) Amount and duration of sheening, distance to resources of concern
- 2) Degree of exposure: High energy breaks up sheens; Low energy, sheens more persistent; episodic
- 3) Timing of resource presence or use



# Sheens...

- Represent a very small amount of oil
- They are very difficult to pick up
- **Key concern usually is:** potential for sheens to affect sensitive areas and people

Table 2. Oil Spill Observation Glossary\*

	Approximate Layer-Thickness		Approximate Volume per Acrea	
	millimeters	inches	liters/km <sup>2</sup>	gallons/nm <sup>2</sup>
barely visible	0.00004	0.000002	50	40
silver sheen	0.00007	0.000003	100	75
first color trace	0.0001	0.000004	200	150
bright colors	0.0003	0.00001	400	300
dull colors	0.001	0.00004	1,200	1,000
dark colors	0.003	0.0001	3,600	3,000

\*Reproduced from the "Oil Spill Slide Rule," ©1985 Government Publishing Office The Hague/The Netherlands

2 oz = 100 sq feet of sheen  
 1/8 teaspoon = 1 sq foot of sheen







# Sheens in the Kalamazoo River on 23 October 2012





# No Longer Rubs off on Contact

- Oil removal to a stain or coat, or weathering so it is no longer sticky
- Hard substrates and vegetation
- Prevent oiling during contact with oiled surfaces
- Consider the degree and timing of use



Often Applied to Oiled Vegetation:  
Yellowstone River Spill –  
Oiled vegetation was surgically cut





# Use of Fixatives to Meet Endpoints





# Use of a Surface Washing Agent in Public Areas





# Removal to where Recovery can Occur without Causing More Harm than Leaving the Oil in Place

- Most difficult to explicitly define
- Often used for more sensitive shorelines, remote areas
- Passive oil recovery required to minimize off-site impacts
- Monitor to verify assumptions on natural removal and recovery





**Zone 2: Oiled Creek**  
SCAT recommendation  
for Operations



**Zone 3: Recovery**  
Operations handled  
by OSROs.











# Actionable Cleanup Endpoints

- For All: Define area based on shoreline use, substrate and location.
- Qualitative Endpoint
  - Define endstate based on location and thickness of acceptable oiling
- Operational Endpoint
  - Define endstate based on field test Ops can do. *ie: flush until no black or brown oil is released.*

# Selecting Cleanup Endpoints

- 1) Formulate them early in the process
- 2) Realize they should and will be modified
- 3) Proceed with cleanup as long as it speeds recovery
- 4) Stop when it becomes:
  - ineffective
  - offers no value to natural recovery
  - slows the recovery process



# In Summary

- Many different perspectives on how clean is clean
- Some resource(s) may take precedent
- Always uncertainty in the rate of:
  - natural removal
  - duration and amount of sheening
  - oil weathering to non-sticky
  - risks to animals who use oiled habitats